APRIL 1934

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THE WIRE ASSOCIATION 17 East 42nd Street, New York, N. Y.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

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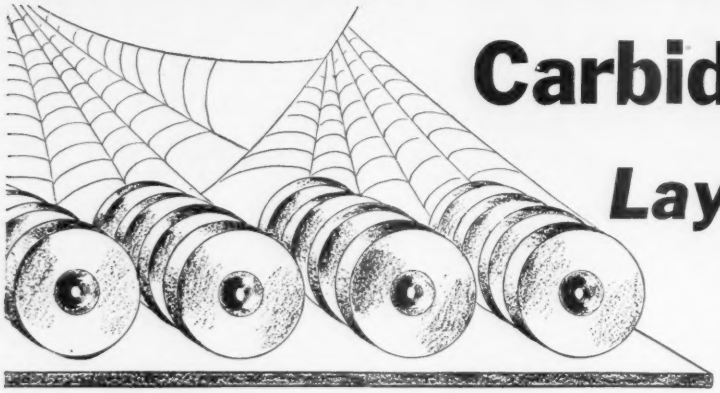

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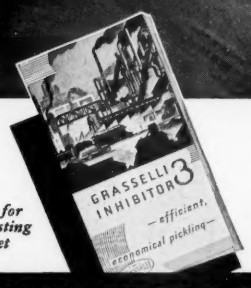

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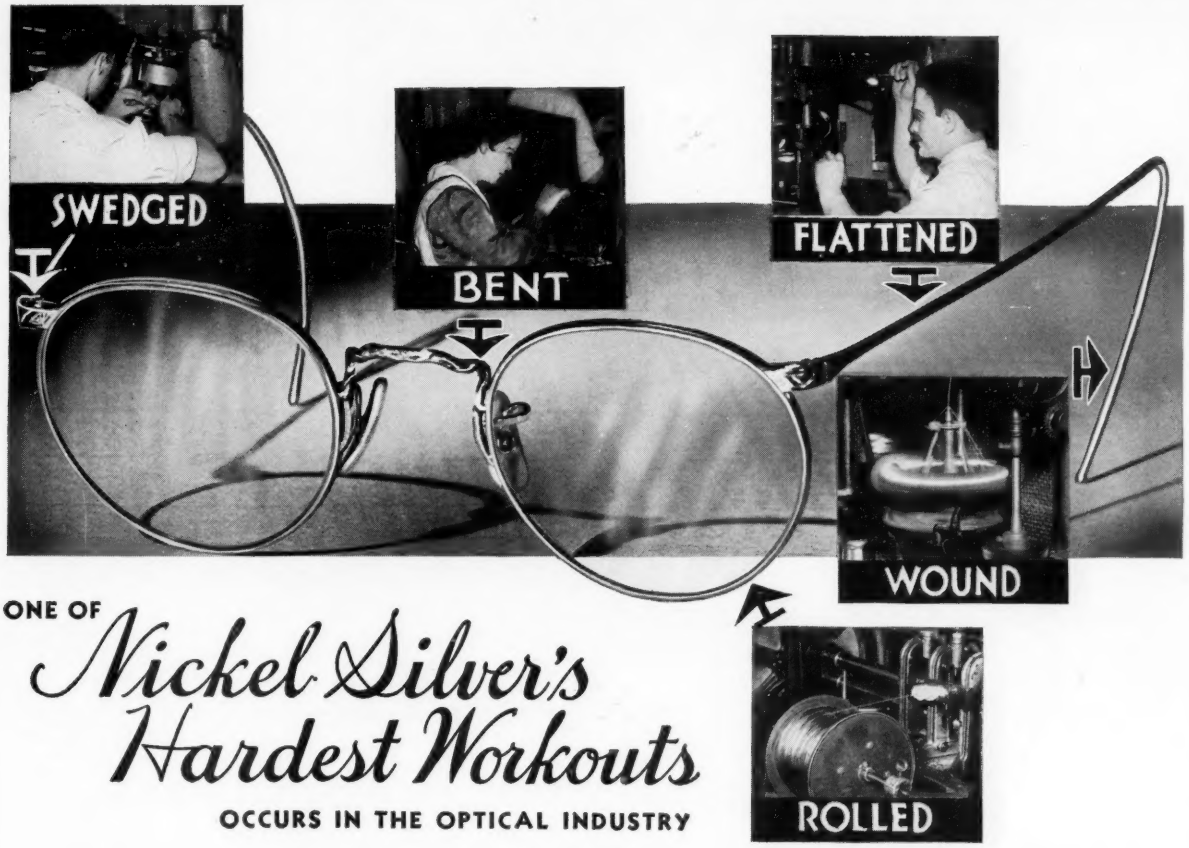

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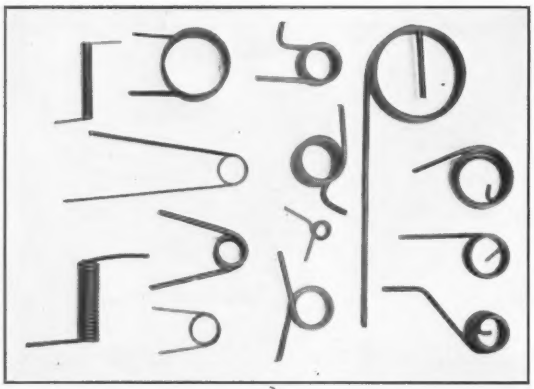

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip Wire Products and Insulated Wire and Cable.

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 9 April 1934 No. 4

Designated as

Official Publication By The Wire Association

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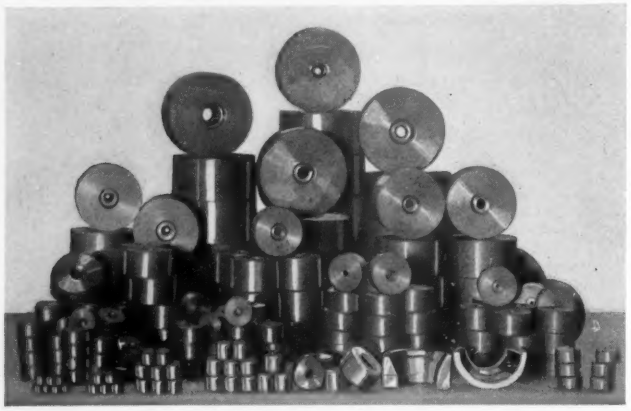
FIRTHALOY WIRE DRAWING DIES



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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 9 April 1934 No. 4

Lead Cable Sheath Extrusion

By Waldo L. Sherman

Secretary-Treasurer, John Robertson Co., Brooklyn, N. Y.

A series of studies of defects which sometimes occur in extruded lead, to determine the means by which such defects may be eliminated. See page 113 for Index to Tests.

THOSE engaged in the manufacture of products such as lead covered cables, rubber garden hose, lead pipe, solder wire, lead strips and other miscellaneous shapes of lead and lead alloys occasionally find defects in their products which are not easily explained. Sometimes these defects are difficult to overcome and at other times they are momentary and not of serious consequence.

A study has been made in an effort to determine the cause of these defects in the extruded metal and to devise means by which these defects may be overcome or eliminated.

✦ ✦ ✦

What Happens in the Extrusion Cylinder:

TWO processes of extrusion for lead are in general use:

✦ ✦ ✦

(1) Hot Or Poured In Process

THE first is the hot or poured in process in which the molten lead is poured into the extrusion cylinder and there allowed to solidify under pressure before it is extruded. This process is in most general use and is used where the most perfect products are required, as in the manufacture of lead encased power cables and lead pipe.

✦ ✦ ✦

(2) Billet Or Slug Process

THE other process is the billet or slug process in which precast billets of lead are conveyed to the extrusion press and there put into the extrusion cylinder and extruded promptly without any waiting time. This process more than doubles the productive capacity of the equipment and is used in the manufacture of rubber garden hose and rubber covered wires and cables when the lead covering is used as a mould in which the rubber products are vulcanized and this lead covering is subsequently stripped off and re-melted for repeated use. Other lead and lead alloy products are extruded by the billet process such as solder wire, came lead and miscellaneous shapes and strips of lead which may be used for gaskets, moulding, etc.

✦ ✦ ✦

Micro Photographs Showing Changes In Structure of Vertical Lead Sections During Extrusion

Test L

PLATES Nos. 224 to 230 inclusive show a series of vertical sections of lead as taken from an extrusion cylinder. No. 224 shows the structure of the lead in the cylinder. This lead was poured into the cylinder and cooled under pressure, the pressure being sufficiently great to just start the extrusion process.

✦ ✦ ✦

PLATES Nos. 225 to 230 show the structure of the lead in slugs taken from the same extrusion cylinder, but indicating how the structure changed as the extrusion progressed.

✦ ✦ ✦

PLATES Nos. 220 to 223 inclusive show the effect of pressure and partial extrusion on pre-

cast slugs. In Plate No. 220 the slug was cast and put into the extrusion cylinder and pressure applied, but not sufficient pressure to produce extrusion.

✦ ✦ ✦

PLATES Nos. 221, 222 and 223 show similar cast slugs partially extruded indicating the change in crystaline structure as the extrusion progressed.

✦ ✦ ✦

Changes in Crystal Formation

IT will be observed from comparison of the two groups of plates above referred to that the lead crystals are relatively large whether the cylinder change is cooled under pressure or without pressure, but it must be also recognized that when the cylinder charge cools under pressure, it is free from voids or air pockets. It will also be observed that the crystals of lead remain large until they are broken up by the flow of the metal and that the more the metal is worked, the finer the crystals become.

✦ ✦ ✦

Flow Lines During Extrusion

(See Plate No. 292 Page 107 and Plate 269 Test N. Page 107)

PLATE No. 292 is an interesting illustration of the manner in which a series of discs of wax flows through one another as they are extruded.

✦ ✦ ✦

PLATE No. 269 shows the same effect when discs of lead are extruded, although the demarcation between the discs of lead is not nearly as apparent as with the different colors of wax.

✦ ✦ ✦

Charges of Lead Pass Through Residue of Previous Charges

(See Plate 320. Page 108)

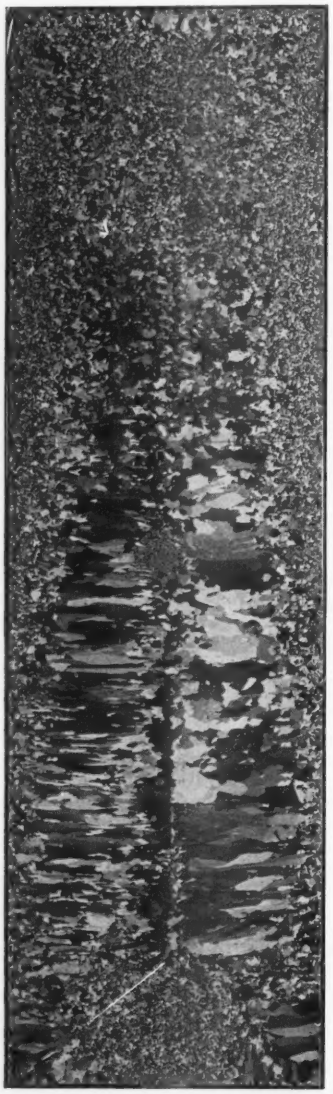
PLATE No. 320 is a vertical section taken from an 8″ diameter extrusion cylinder. The lower section of the illustration shows the residue or what remained in the extrusion cylinder after twenty charges of lead had been extruded. Then a 6″ new charge of lead was poured in and a 25-ton setting pressure applied. It is clearly apparent that the new charge of lead did not unite with the lead which remained in the extrusion cylinder. To accomplish a perfect union between the new and the old charges of lead, it would be necessary to apply sufficient heat to melt the surface of the residue. That part of the new charge of lead which comes in con-

TEST L

Samples were all poured in the extrusion cylinder of a solder wire extrusion press; cylinder being pre-heated to 220 degrees Fah. maximum at start and decreasing to 202 degrees Fah. at 7th slug.

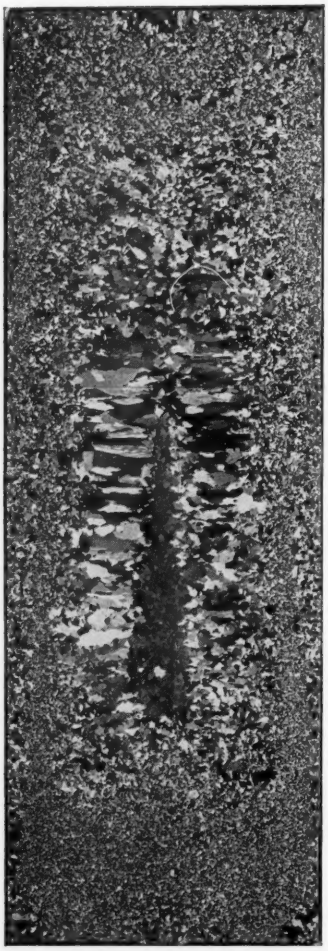
Lead Used: New Pig of Omaha & Grant, melted in small pot. No lubricant used.

Setting pressure of 25 tons was applied to each sample for a period of 6 minutes.



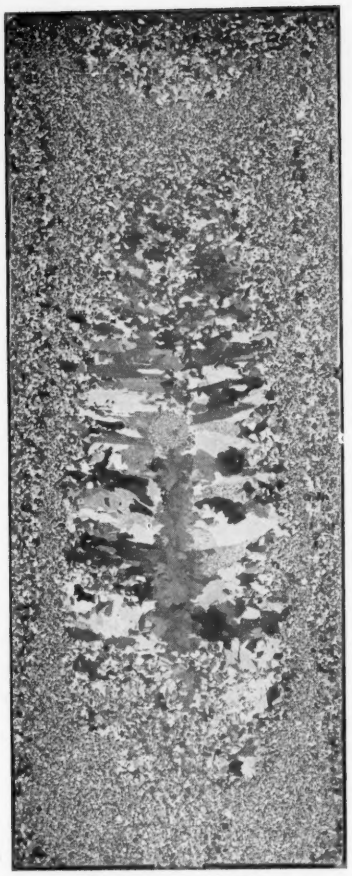
TEST L—PLATE 224

Crystal Structure after applying only the 25 tons setting pressure. ✦ ✦ ✦ ✦

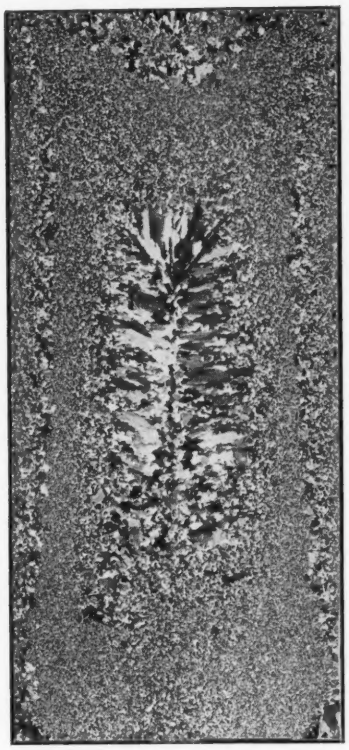


TEST L—PLATE 225

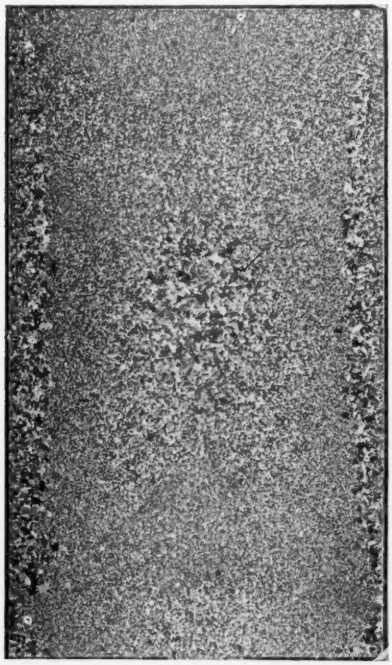
Crystal structure after extruding 1 inch. Max. Pressure 80 tons. Min. Pressure 75 tons. ✦



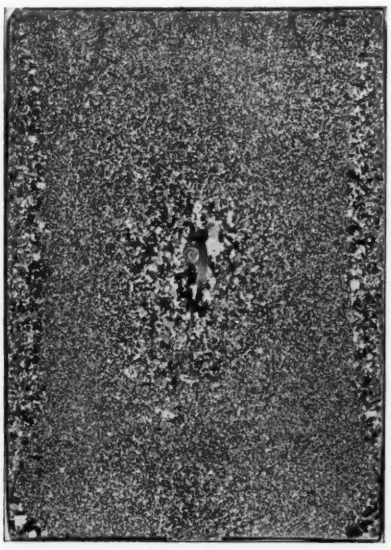
TEST L—PLATE 226
Crystal Structure after extruding 2 inches. Max. Pressure 80 tons. Min. Pressure 68 tons. ✦



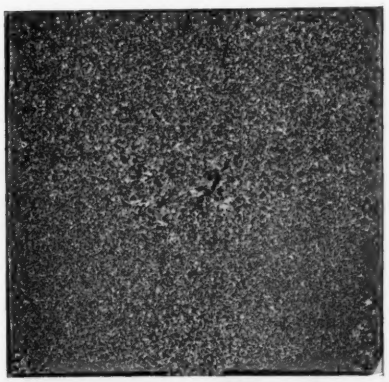
TEST L—PLATE 227—Crystal Structure after extruding 3 inches. Max. Pressure 80 tons. Min. Pressure 61 tons. ✦



TEST L—PLATE 228
Crystal Structure after extruding 4 inches. Max. Pressure 80 tons. Min. Pressure 58 tons. ✦



TEST L—PLATE 229
Crystal Structure after extruding 5 inches. Max. Pressure 80 tons. Min. Pressure 55 tons. ✦



TEST L—PLATE 230
Crystal Structure after extruding 6 inches. Max. Pressure 80 tons. Min. Pressure 48 tons. ✦

tact with the residue does not carry sufficient heat to melt the surface of the residue completely. Different schemes have been tried in an effort to effect a perfect bond between the new charge of lead and the residue, but so far as is known to the writer, none of these schemes are sufficiently successful to encourage their general use.

✦ ✦ ✦

FROM the foregoing it will be understood and realized that each new charge of lead when extruded must to a certain extent pass through the residue of previous charges.

✦ ✦ ✦

Flow Lines In Lead Cable Sheath

PLATE No. 237 shows the flow lines in lead cable sheath which result from the passage of a new charge of lead through the residue remaining in the lead cylinder.

✦ ✦ ✦

Residue In Cylinder Retains Foreign Matter

THE results of many tests show that the residue in the lead cylinder after repeated charges of lead have been extruded contains an accumulation of much of the foreign matter or inclusions which are present in each charge of lead.

✦ ✦ ✦

THE principal sources of this foreign matter are:

1—The oxide held in the lead which solidifies and clings to the extrusion cylinder wall during filling of cylinder;

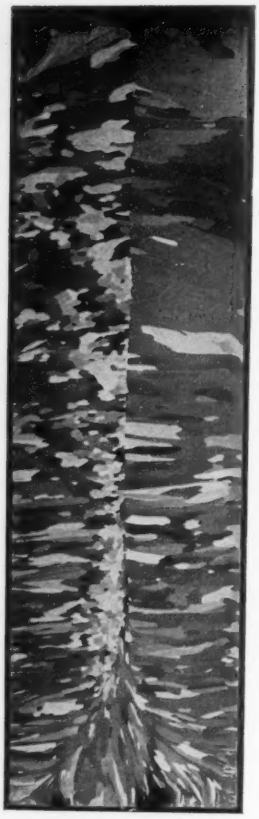
2—The dross or skimmings which form on top of the lead as

TEST K

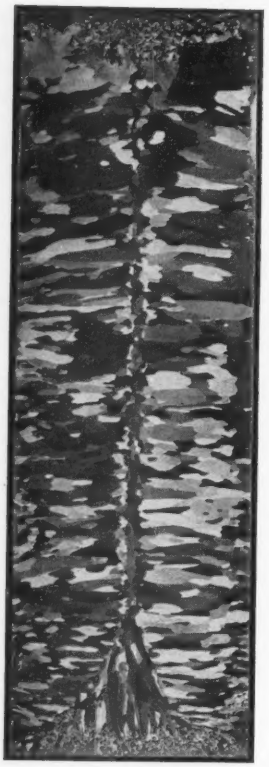
To determine the Cause of Groups of Small Crystals. Each of four slugs were cast in a mold pre-heated to 300-350 degrees. Fah. Removed from mold and allowed to cool, resting on the floor.

Lead Used: Omaha & Grant. No Lubricant used.

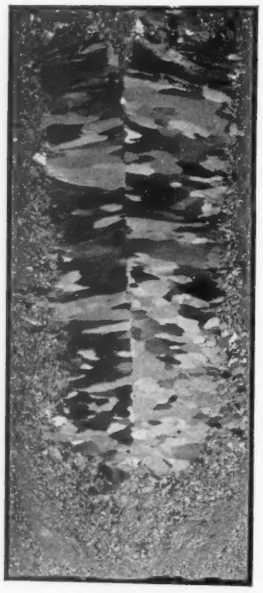
None of the samples were cut to square the ends.



TEST K
Plate 220 Reduced—Crystal Structure of lead as cast. ✦ ✦

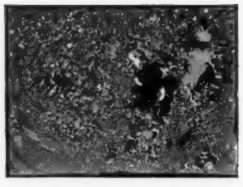


TEST K
Plate 221 Reduced—Crystal Structure after applying 100 tons setting pressure. ✦ ✦ ✦ ✦



TEST K
Plate 222 Reduced—Crystal Structure after extruding 2 inches thru' an 8-hole wire die. Each hole ⅛" dia. Spaced on 1" circle. ✦

With the three samples shown in Plates 221, 222, 223, the pressure was applied on the cold slug in a cold cylinder. ✦ ✦



TEST K
Plate 223 Reduced—Crystal Structure after extruding 6 inches thru same die as previous sample. ✦

it is poured into the extrusion cylinder;

3—The carbonized lubricant which may come from the extrusion cylinder walls or extrusion ram surface.

✦ ✦ ✦

Inclusions in the Lead

IT must be apparent that any substantial amount of inclusions segregated in the lead will cause a weakness at that point. It is therefore, important to eliminate so far as possible segregations of inclusions. This may be best accomplished by eliminating in so far as it is possible the presence of inclusions because if they are present they will accumulate at some point or points in the process and pass into the product at an unforeseen and unknown moment remaining undiscovered sometimes until it is too late to make the correction without great expense.

Test P

(See Plate No. 566. Page 110 and Plates on Page 109)

PLATE No. 566 shows a section of lead residue taken from a point in the extrusion apparatus after 101 charges had been extruded. In so far as was possible, the presence of inclusions was eliminated and in this residue there is no apparent accumulation of inclusions.

✦ ✦ ✦

Test B

(See Plates on Page 110)

PLATE No. 99 shows a similar section of lead taken at the same point after a run in which ordinary precautions were used. The segregation of inclusions is clearly apparent. It is the "washing off" of parts of such segregations into the product that causes most serious difficulty.

Crystal Formation:

IT has been claimed that if extruded sections of lead are annealed, the crystals of lead will grow from their broken-up or extruded sizes to larger and more natural crystal sizes and shapes, and furthermore, that this growth will not cross lines or surfaces which contain inclusions of any kind.

✦ ✦ ✦

Illustrations of Changes in Crystal Formations Due to Annealing

THE following illustrations were taken from a study of this condition: (Test P. Pages 109-110)

No. 569: Shows the same section of lead as 566, after it has been annealed and re-etched; the old crystals show, with new boundaries of the larger crystals;

(Text continued on page 107)

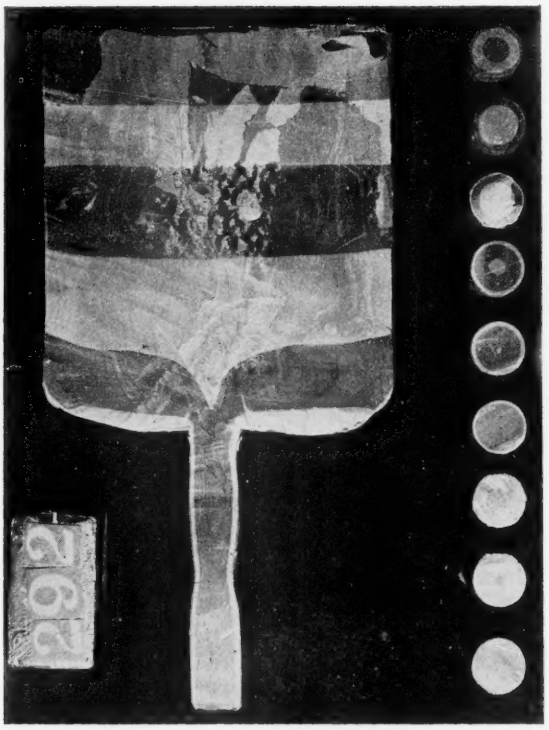
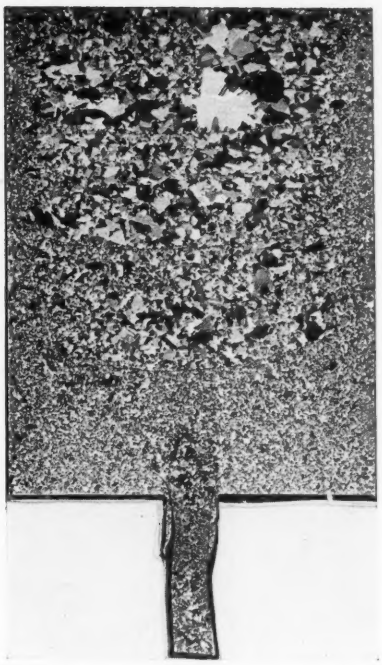


PLATE 292

Illustrating the manner in which a series of discs of wax flows through one another as they are extruded. ✦ ✦ ✦



TEST N—PLATE 269

Discs were re-assembled as they were before cutting, corresponding to a line drawn along the slug before the cutting. No Lubricant used. Temperature of extrusion cylinder 210 degrees Fah. Setting pressure of 25 tons applied until discs were 210 degrees Fah. Maximum starting pressure 60 tons, Minimum pressure 55 tons. Depth extruded 2 inches. (The flow of lead in extrusion is similar to that of the flow of wax shown in No. 292). ✦

TEST N

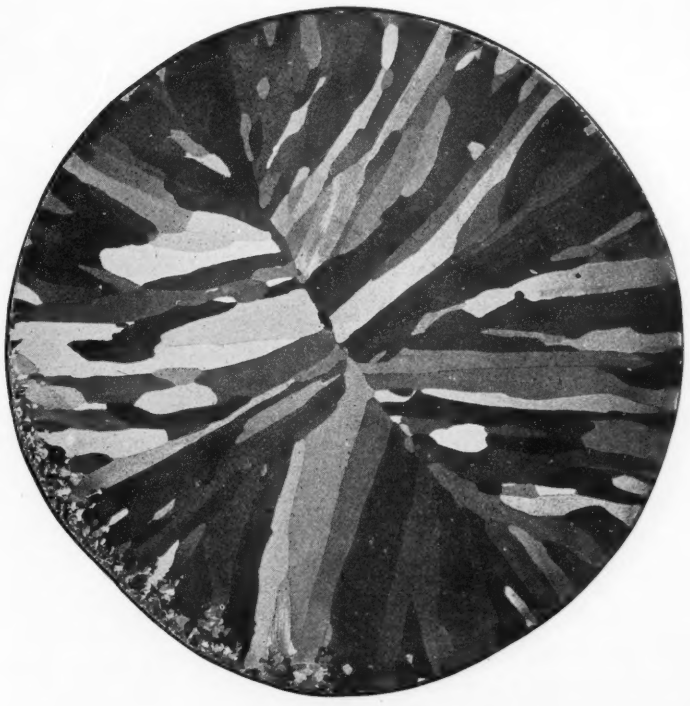
To determine the relative movement of the lead in different parts of the extrusion cylinder. Slug was cast in a preheated mold, removed from mold and allowed to cool on the floor. Slub was cut into 7 discs, each 13/16″ thick. Faces of discs were painted red and black so that 2 red surfaces came together and 2 black came together.

(*Text continued from page 106*)

No. 595: Same as above, except that the section after annealing was re-faced and etched; showing only the new crystal boundaries;

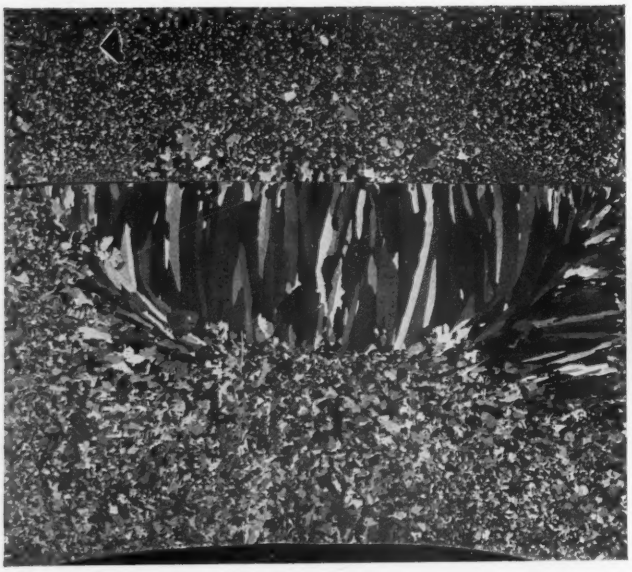
No. 564: Shows the lower left-hand corner of No. 222, enlarged six times, re-faced, annealed and etched; showing crystal growth, also lines over which the crystals did not grow.

(*Text continued on page 108*)



TEST N—PLATE 160

Magnified 2X. Crystal Structure of Cross Section of slug cast in pre-heated mold, removed from mold and allowed to cool resting on the floor. ✦



No. 320—Vertical section taken from an 8 inch dia. extrusion cylinder. See text. Page 104. ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦

No. 237—Flow lines in lead cable sheath which result from the passage of a new charge of lead through the residue remaining in the lead cylinder. ✦ ✦ ✦ ✦ ✦ ✦ ✦

(*Text continued from page 107*)

Tests On Three Different Brands of Lead

THE following three groups of illustrations were taken from the test which we made on three different brands of lead.

✦ ✦ ✦

Brand A.

Plate No. 441 (Page 111)

BRAND "A", No. 441, shows a vertical section of the residue left in the lead cylinder after 74 charges had been run using ordinary precaution in regard to inclusions.

No. 537: Shows the same section of lead annealed, re-faced and etched and shows the growth in crystals. (Page 111)

No. 546: Lower left-hand corner of No. 537 times two. (Page 112)

No. 547: Lower right-hand corner of No. 537 times two. (Page 111)

✦ ✦ ✦

Brand No. 2

Plate No. 570 (Page 112)

BRAND No. 2, No. 570: This shows vertical section of the residue taken from the lead cylinder after 74 charges had been run using ordinary precaution to keep out excessive inclusions and with careful lubrication of the extrusion ram.

No. 578: The same section annealed, re-faced and etched. (Page 112)

No. 571: Upper left-hand corner of No. 570 times two. (Page 112)

NOTE: Brand No. 2 was a copper-bearing lead.

✦ ✦ ✦

Brand No. 3

Plate No. 457 (Page 113)

BRAND No. 3, No. 457, vertical section of the residue taken from a lead cylinder after 74 charges had been run using ordinary care to reduce inclusions and with the ram end carefully lubricated.

No. 534: The same section annealed, re-faced and etched, showing the growth of crystals and the flow lines where inclusions appear to be trapped. (Page 113)

No. 535: Lower right-hand corner of No. 534 times two; annealed once. (Page 113)

No. 561: Lower right-hand corner of No. 534 times two; annealed twice. (No. 561 proved that the specimen shown in No. 535 was not completely annealed). (Page 113)

Bursting Tests

IN an effort to determine why, when and where lead sheath should fail under internal pressure, many bursting tests were run. In the production of these samples of lead sheath, ordinary care was taken to have the lead reasonably free from inclusions and care was taken when lubricating the lead ram. In other words, an effort was made to produce what might be called "commercial lead sheath." The specimens for bursting were six feet long and internal hydraulic pressure was used from accumulator service. The pressure was set so that there would be a time element and the time taken to burst the specimens varied from 8 minutes to 800 minutes. None of the specimens failed in such a way as to indicate the presence of excessive inclusions. None of the specimens failed exactly in the weld. Some of the specimens failed in the area of large crystals. Some of the specimens failed in the area of small crystals. A large majority of the specimens failed in the region of minimum wall thickness.

(*For continuation of text please turn to page 110*)

TEST P

101 Charges, Pure Lead, Without Lubrication. 8″ diameter by 19¾″ deep Lead Cylinder. New 24″ lead pot with quick working valve. Speed of extruded sheath, 30 ft. per minute.

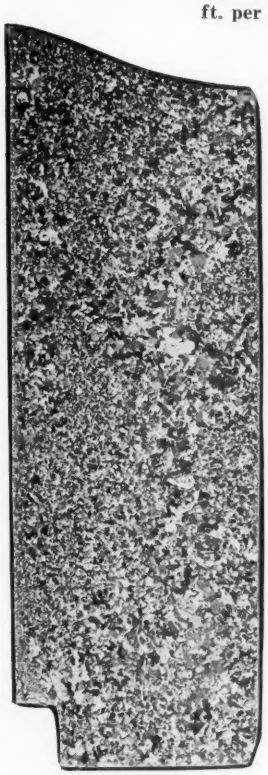


Plate 289—Vertical section thru Lead Cylinder, center to left, at center of port-holes in die-block.

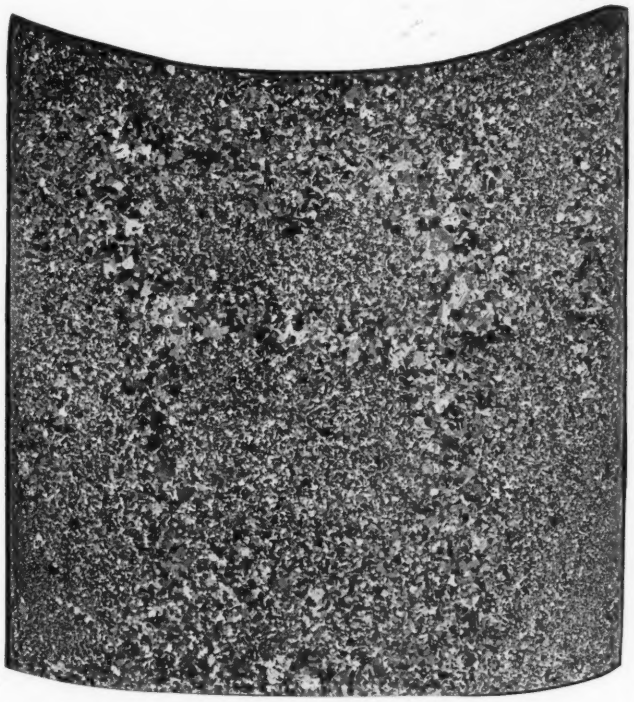


Plate 293—Vertical section thru lead cylinder, front to back over bridge of die-block. ✦ ✦

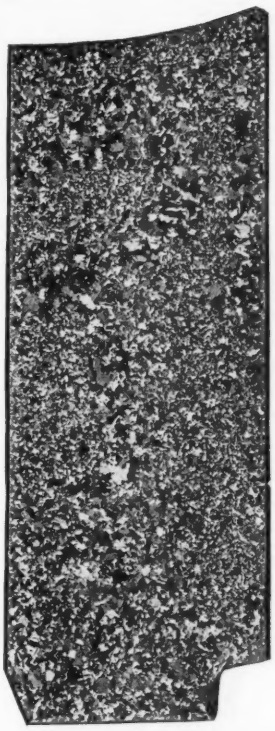
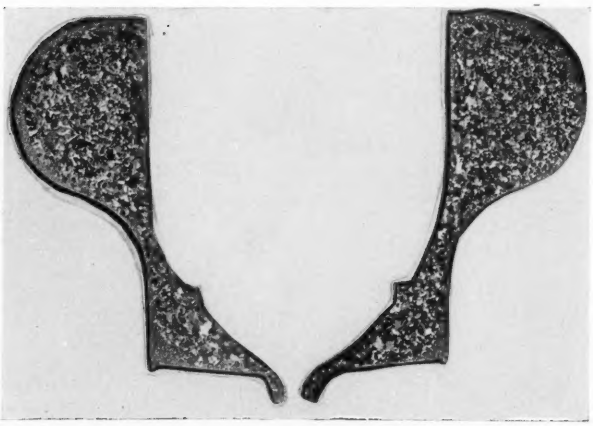


Plate 290—Vertical section thru Lead Cylinder, center to right, at center of port-holes in die-block.

(Also see Plate 566 Page 110 and Plates 569, 595 and 564, Page 111).



TEST P

Left hand side — Plate 297

Right hand side — Plate 295

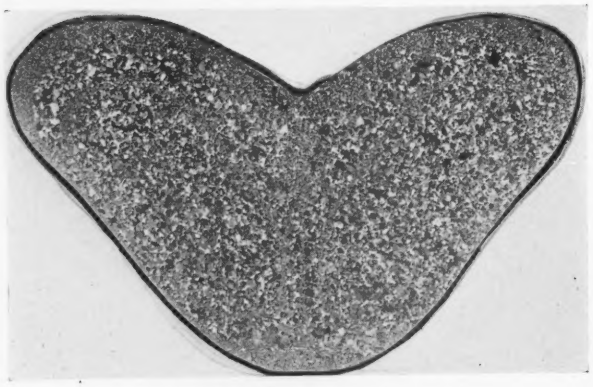
✦ ✦ Horizontal section through center of die block. ✦ ✦

TEST P—PLATE 298

Horizontal section half way below center of die block. ✦ ✦

Test P

(*Continued from Page 109*)



TEST P (See Previous Page)

PLATE NO. 566 (Also Plate No. 294)

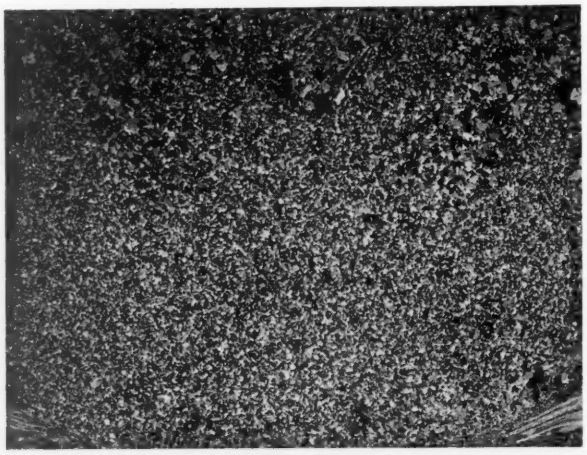
Horizontal section through bottom of die block. ✦ ✦ ✦

Pressure in tons	Temperature °F
1075 Max.	420-390 Top
800 Min.	350-320 Bottom

(Also See Page 111—Plates 569, 595 and 564)

TEST B

12 Charges, Pure Lead, With Lubrication. 8″ diameter by 19″ deep Lead Cylinder. 18″ Lead Pot. Coated with Oxides. Travel of Lead Ram, 4″ per minute.

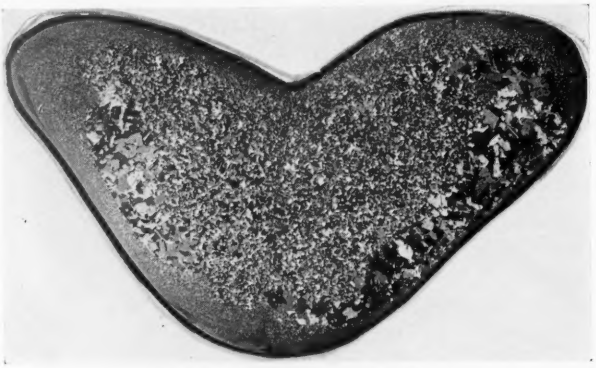


TEST B—PLATE 90

Vertical section thru Lead Cylinder Front to Back, over bridge of die-block.

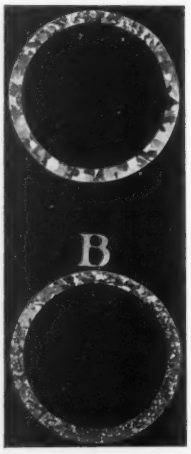
TEST B—PLATE 102B

Horizontal section through center of die block. ✦ ✦ ✦



TEST B—PLATE 99

Horizontal section through bottom of die block. ✦ ✦ ✦



TEST B—PLATE 138

Cross-section of sheath extruded during eleventh charge. Top beginning, bottom end of charge. ✦ ✦ ✦

Temperature °F	Pressure in ton
380-420 Top	990 Max.
320-350 Bottom	750 Min.

(*Text continued from page 108*)

Conclusions:

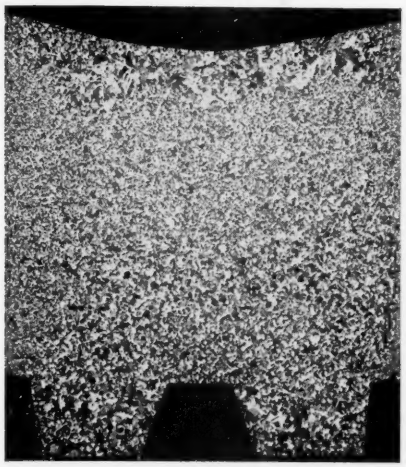
1—The size of the lead crystals does not have any apparent effect on the strength of the lead sheath;

2—When excessive inclusions are not present, the sheath will probably fail first at its thinnest point;

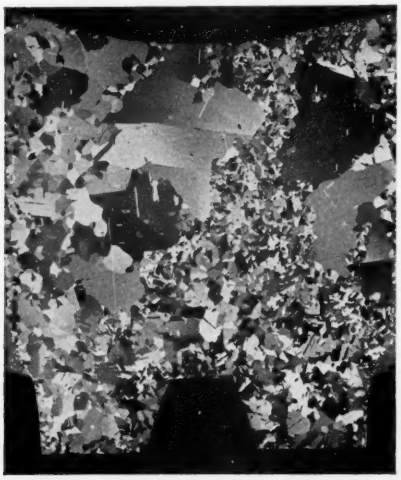
3—Lead sheath extruded with ordinary precautions does not show any weakness chargeable specifically to the die-block weld.

(*Text continued on page 112*)

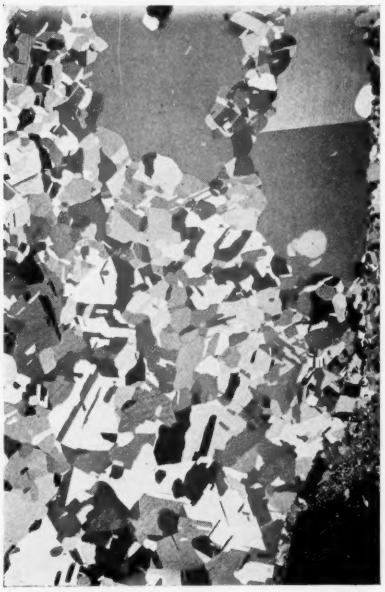
Tests On Brand A



No. 441—Brand "A" shows vertical section of residue left in lead cylinder after 74 charges had been run. ✦ ✦ ✦ ✦



No. 537—Brand A—Shows same section as No. 441 annealed, refaced and etched and shows the growth in crystals. ✦ ✦ ✦

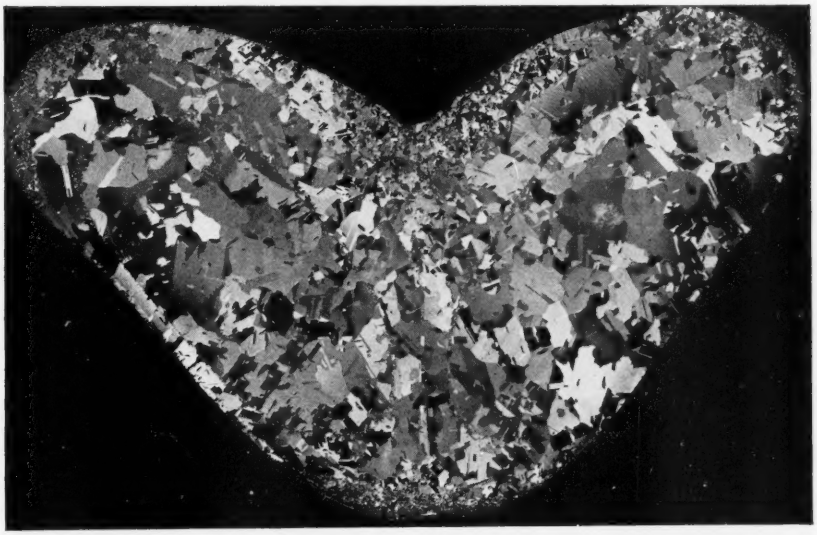


No. 547—Brand A—Shows lower right-hand corner of 537 times two. ✦ ✦ ✦

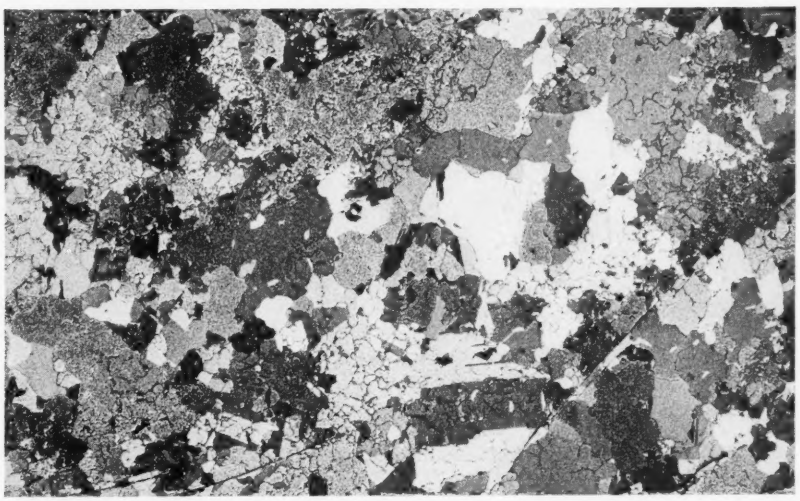
Test P

(*Continued from Page 110*)

TEST P—No. 569—Same section of lead as 566, (see pages 109, 110), after it has been annealed and re-etched; the old crystals show, with new boundaries of the larger crystals. ✦ ✦ ✦



TEST P—No. 595—Same as 569 except that the section after annealing was refaced and etched. Old crystals show with new boundaries of larger crystals. ✦ ✦ ✦ ✦ ✦ ✦



TEST P—No. 564—Shows lower left-hand corner of No. 222 enlarged six times, re-faced, annealed and etched, showing crystal growth, also lines over which the crystals did not grow. ✦ ✦ ✦

Test On Brand A.

(*See page 111 and text*)

No. 546—Brand A—Shows lower left-hand corner of 537 times two. ✦ ✦ ✦

✦ ✦ ✦

(*Text continued from page 110*)

4—Satisfactory lead sheath is produced with regular lead encasing die-blocks when ordinary precautions are taken to reduce inclusions and foreign matter in the lead;

5—Greater uniformity in lead wall thickness will mean more uniform strength and greater life to the lead sheath;

6—Better lead sheath will be obtained if greater care is used in its production with especial regard to:

a—Inclusions.

b—Uniformity of Wall.

c—Extrusion Speed.

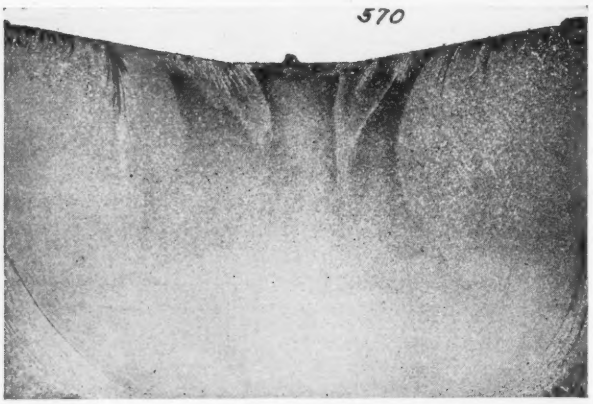
d—Increased Wall Thickness.

e—Shrinkage or Grip of Sheath on Cable.

✦ ✦ ✦

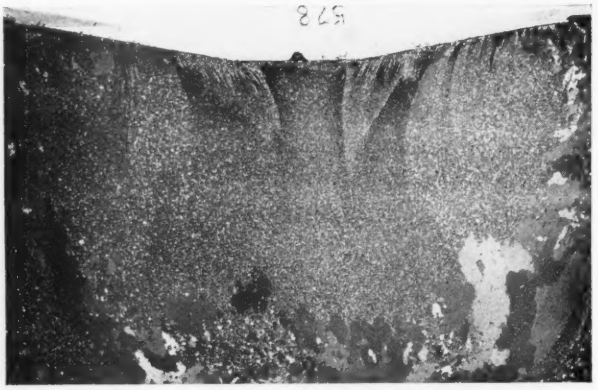
THE items not discussed here will be given consideration at some future time. Those who are producing lead covered cables scientifically, realize that "greater care" is the essence of "better cable sheath."

Tests On Brand No. 2



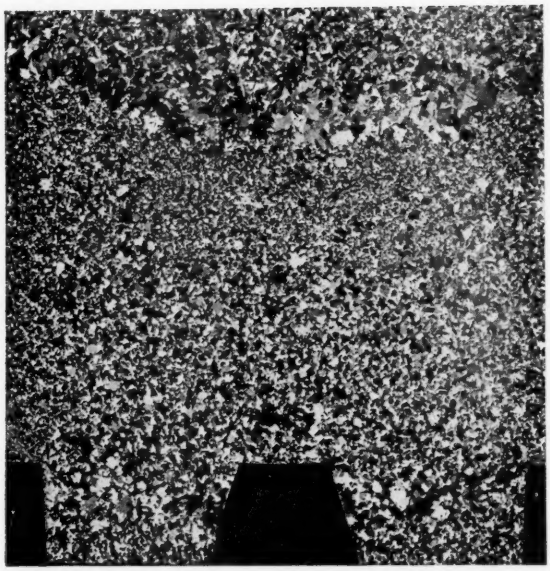
No. 570—Brand No. 2—Shows vertical section of the residue taken from lead cylinder after 74 charges had been run. ✦ ✦ ✦

No. 571—Brand No. 2—Shows upper left-hand corner of 570 times two.



No. 578—Brand No. 2—Shows same section as 570, annealed, refaced and etched. ✦ ✦ ✦ ✦ ✦ ✦

SEE PAGE 113 FOR TESTS ON BRAND NO. 3



No. 457—Brand No. 3—Vertical section of residue taken from lead cylinder after 74 charges had been run. ✦ ✦ ✦ ✦ ✦

No. 534—Same section as 457, annealed, refaced and etched showing the growth of crystals. ✦ ✦ ✦ ✦ ✦ ✦

No. 535—Lower right-hand corner of No. 534 times two, annealed once.

No. 561—Lower right-hand corner of 534 times two, annealed twice. ✦

INDEX TO TESTS AND MICROPHOTOGRAPHS

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Test K—Page 106.
Plate Nos. 220, 221, 222, 223.
Test N—Pages 107-108.
Plate Nos. 292, 269, 160.
Test P—Page 109.
Plate Nos. 289, 293, 290, 297, 295, 298.
Page 110—Plate Nos. 566 (294).
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Plate Nos. 441, 537, 547.
Page 112—Plate No. 546.
Brand No. 2 Test—Page 112.
Plate Nos. 570, 571, 578.
Brand No. 3 Test—Page 113.
Plate Nos. 457, 534, 535, 561.

Successful Safety Practice in Wire Mills

By Hilton E. Wright

Safety Engineer, Labor & Service Department
Westinghouse Lamp Co., Bloomfield, N. J.

The Wire Products Division of the Westinghouse Lamp Company has made one of the outstanding accident records of the wire products industry---to November 30, 1933, a total of 1,366,664 man hours without a disabling injury to a worker. The last lost time accident of this Division was on April 18, 1931. The following article by Mr. Wright describes the general accident control methods for all divisions of the plant which enabled the Wire Products Division to achieve this remarkable safety record.

WITH only a base, a glass bulb, and a filament inside, an incandescent mazda lamp appears to be a simple device. Yet we must call on 17 nations and 24 states of this country for the raw materials which go into its construction. The purification of these raw materials and then the molding of countless parts into the finished product require processes of nearly every description known to modern manufacturing.

✦ ✦ ✦

Safety Practice Necessary

SMALL wonder then that the job of safety supervision in lamp manufacture is complex and carries a high accident potential. In those industries where but one or two products are manufactured, or where the work is chiefly that of assembly, safety practice can follow a fairly definite routine day in and day out. Our manufacture, however, includes some 10,000 different sizes and types of lamps and numerous power, X-ray, and control tubes among other sundry devices. In a majority of these products the design is changing constantly and that requires a safety practice which must accordingly change in order to maintain good safety conditions.

✦ ✦ ✦

SINCE so many processes in lamp manufacture deal with glass products, the majority of accidents here occur from breakage. For the first ten months of 1933 the ratio of lost-time to minor accidents was 1 to 119 and 33 percent of these were lacerations, mostly from glass.

IN the past four years the safety record of the Westinghouse Lamp Company is recorded in table A:

ON November 30, 1933 the standing of the various divisions of the Westinghouse Lamp Company, based on hours worked since the last lost-time accident, is shown in the accompanying table. (Table B).

✦ ✦ ✦

Method of Control

THE variety of work embraced in the manufacture of Mazda lamps necessitates a decentralized method of safety supervision in which each division looks after its own accident prevention. The Superintendent of each division establishes his own method of con-

TABLE A

LOST TIME AND DISABLING INJURIES (1)

	1930	1931	1932	1933**
Accident Frequency Rate	3.10	1.80	1.59	1.06
Accident Severity Rate	0.65	0.12	0.55*	0.03

ALL ACCIDENTS (2)
(Minor and Lost Time)

	1930	1931	1932	1933**
Accident Prevention Efficiency	94.00%	96.69%	97.64%*	97.36%

(1)—Rates computed by the recognized method.
(2)—Based on the number of accidents per 10,000 hours exposure minus the resultant rate from 100 which represents a perfect performance.
*—This rate increase caused by one accident resulting in total loss of an eye.
**—Eleven months of 1933.

TABLE B
STANDING NOVEMBER 30, 1933

	Hours Worked Since Last Lost Time Accident	Date of Last Lost Time Accident
Associated Departments General Offices, Commercial Engineering, Research Laboratories and Service Departments	1,628,603	4/3/1929
Incandescent Lamp Div., Trenton	367,566	5/10/1933
Belleville Base Plant	112,223	8/21/1933
Engineering Laboratories	183,655	3/27/1933
Wire Products Division	1,356,664	4/18/1931
Equipment & Development Division	2,543,037	3/11/1932
Warehouse—Shipping and Receiving	663,925	9/8/1929
Special Products—Power Tubes, etc.	1,062,489	1/30/1931
Incandescent Lamp Division, Bloomfield	1,004,870	4/10/1933

trol. Though the procedure in each division may differ in detail, it parallels the following general classification:

1. **Investigation by the supervisor and his personal report to the Superintendent.**
2. **Investigation of certain accidents by the Assistant Superintendent or other person in the operating division charged with the prevention of accidents.**
3. **Investigation conducted by the Labor and Service Department of certain types of accidents.**

✦ ✦ ✦

SAFETY inspections throughout the plant are the function of division committees appointed by the Superintendents to whom they report and from whom they receive instructions. Following an inspection tour, a written report, signed by the Chairman of the committee is submitted to the Superintendent. He adds his comments and then files the original report for periodical examination by the Labor and Service Department. Periodical inspections of each division, examining the premises, equipment, and a review of all records pertaining to safety, are conducted by the Labor and Service Department.

✦ ✦ ✦

Supervising Committees

AS the supervision of safety within the divisions is the function of committees, so is that for the entire plant. There are two main committees performing this work, namely, the Managing Committee and the Safe Practices Committee.

✦ ✦ ✦

The Managing Committee

THE Managing Committee consists of five men in an executive or technical capacity. It meets monthly to pass on matters of policy. The Safe Practices Committee is composed of Assistant Superintendents and Department Managers. It also meets monthly and discusses operating safety problems, exchanges ideas, and reviews the unusual and the lost-time or disabling injuries.

✦ ✦ ✦

Labor and Service Department

SUPPLEMENTING the function of these two committees in dictating the general safety policy, the Labor and Service Department renders the divisions a consulting service on matters pertaining to safety. It also conducts surveys and investigations into various manufacturing processes and equipment that present a hazard, and studies the safe performance of operations with the aim of:—

1. **Preventing personal injury and property damage.**
2. **Minimizing or removing exposure to occupational diseases.**

✦ ✦ ✦

Fixing Responsibility

SUPERINTENDENTS are responsible for the conduct of their divisions and the safety of their employes. Rigid investigation is made to fix the responsibility. If it is not clear where to fix the responsibility, or if it is shown that the conduct of the division was not in accordance with good practices, the Superintendent may be requested to appear before the Managing Committee. Such procedure is left to the discretion of the Chairman of the Committee.

✦ ✦ ✦

Employee Cooperation

WHILE an efficient safety organization must first of all be maintained in any factory before accidents can be kept at a minimum, the attitude of the employes themselves is of indisputable importance. In the Westinghouse Lamp Company experienced operators or inspectors are trained to teach new employes. The Assistant Superintendent or perhaps the Department Supervisor will take the new employe in hand and explain the Management's attitude

An illuminated board at the main gate of the Bloomfield Works reminds all workers where their division ranks in company safety. ✦ ✦ ✦ ✦ ✦ ✦ ✦

toward safe workers and what is expected of new employes as safe workers.

✦ ✦ ✦

MOST of our accident prevention efforts are directed at supervision but methods of creating interest in safety are given due consideration. Bulletins of the National Safety Council are displayed on standard bulletin boards in each division. The "Lamp News", a publication for employes, devotes editorial space to the subject of safety as a means of arousing employes' interest. Every year during the New Jersey State-Wide contest each division stages an inter-departmental contest of some description. Experience has shown that these contests are a powerful influence in stirring up employe interest in safety.

✦ ✦ ✦

Effectiveness of Work

THE effectiveness of this work may perhaps be measured in the condition of accident prone employes. The results of a study made in the Westinghouse Lamp Company in 1931, and presented before the New York Safety Conference in 1932, disclosed that not one of the ten having lost-time accidents, had a lost-time accident during the previous two years. Six had not had even a minor accident during the previous year.

✦ ✦ ✦

A FURTHER examination which included a study of the minor accident records of 2,800 employes showed that only one-fourth of one percent might even be classed as prone to accidents. Subsequent studies by the Labor and Service Department at Bloomfield, support the contention that proneness to accidents is not a serious factor in lamp manufacturing.

✦ ✦ ✦

Some Practical Protective Methods Established

WHEREVER possible, protective equipment is provided as a permanent fixture of a machine. An eye shield, fastened to or built in machines, and goggles provided where the work sometimes results in flying glass and wire, are some of the protective means adopted to minimize accidents. Gloves are provided as a protection against heat and broken glass and respirators supplied for operations where glass dust is prevalent.

A special-built, combination truck and gas cylinder holder enables one man to drain heavy gas cylinders in safety.

✦ ✦ ✦

AS a protection against explosion at the position where acetone is sprayed on the inside of the bulbs to provide a coating for photoflash lamps, the equipment is provided with protect-to-seal, an anti-flash-back shield. The equip-

(*Please turn to page 123*)

Before oil barrels were placed over galvanized drip pan numerous minor accidents occurred from workers slipping on oily floor caused from drippings.

✦ ✦ ✦ ✦ ✦ ✦

Seams for Fourdrinier Wires

Part III

By Kürt Jahn, Sallfeld, Thrg. Germany

A description of the methods in use in Germany for obtaining an endless wire belt for fourdrinier paper making machines. The article particularly describes methods of producing various kinds of seams for joining the belt. (Continued from February)

Special Seam No. 19

THE special seam shown in photo 19 is a welded or soldered seam in which the protruding warp ends are face-welded against a separate weft wire which forms the junction between the two ends of the belt. The advantage of this seam, as compared for example with No. 18 is that it leaves all mesh openings of the same size and therefore does not disturb drainage in any degree.

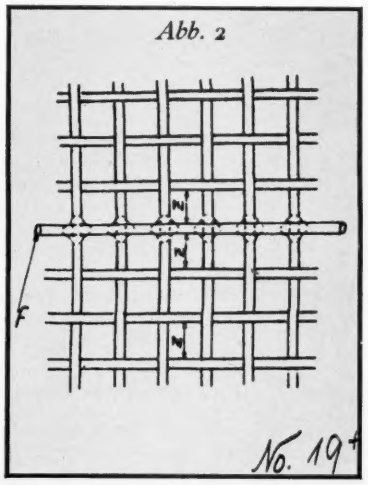
✦ ✦ ✦

AS shown in the photo, the warp wires at each end of the fabric stand out from the last weft wires by an amount designated as "z". They are soldered or welded to the face of a separate wire "f". This wire is of a harder stock than the other weft wires. Any projections left by the welding or soldering are hammered down flat.

✦ ✦ ✦

Special Seam No. 20

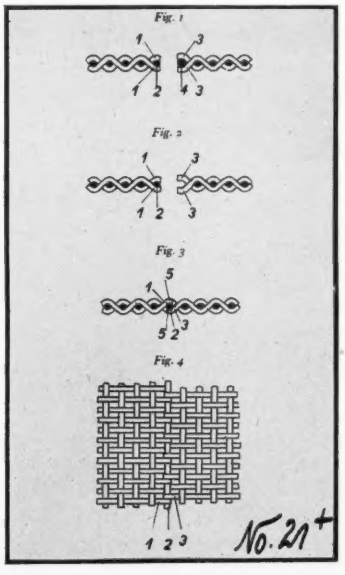
IN making this seamless joint the last weft wire is removed from one end of the fabric, the projecting warp wire ends are spread by means of a special tool, and the fabric ends are brought together in such a way that these projecting warp wires embrace the last weft wire of the other end of the fabric. They are bent around this weft wire and all the warp wires are then soldered to this common weft wire. This joint affects drainage only very slightly.



✦ ✦ ✦

Special Seam No. 21

THIS seam is in effect the same as No. 20 but the process of securing it is somewhat different and the general effect smoother, as it is not necessary to open up the warp ends. The last weft wire woven into the one end, which is to be removed, is somewhat coarser and larger than the normal weft. Naturally, it crimps less, and its removal is more smoothly accomplished. Furthermore the warp ends are now sufficiently spread to embrace the weft wire of the opposing end of the fabric without the use of a spreading tool.



✦ ✦ ✦

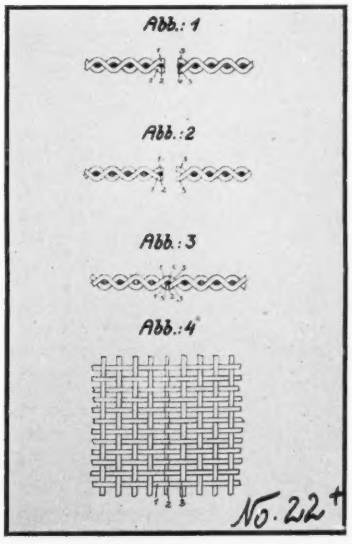
THE warp ends are pressed down smoothly around the common weft wire and are then soldered or welded to it. The photo shows the steps in the making of this joint. Fig 1 shows in cross-section the sheared ends of the fabric, one of which has its last weft wire coarser than normal. In Fig. 2 this coarser wire has been removed. Figs. 3 and 4 show the completed joint.

✦ ✦ ✦

Special Seam No. 22

THIS is another seamless joint, similar to Nos. 20 and 21, but secured in still another way. The

(*Please turn to page 126*)



A Review of Recent Wire Patents

No. 1,943,445-1,943,447, RESILIENT TENSIONING WIRE FABRIC, Patented January 16, 1934, by Arthur A. G. Land, Chicago, Ill.

These patents cover a chain link wire fabric in which the number of the longitudinal rows of the resilient tension mesh sides or legs may be varied so as to afford varying degrees of strength and resiliency to the fabric.

✦ ✦ ✦

No. 1,943,818, APPARATUS FOR COATING WIRE, Patented January 16, 1934, by Charles B. Fantone, Lyndhurst and Reuben M. Jameson, Teaneck, N. J., assignors to Syncro Machine Company, Arlington, N. J., a corporation of New Jersey.

In this coating apparatus, the wire passes thru the reservoir without bending. A tube is positioned within the reservoir thru which the wire passes and prevents surges of the coating material.

✦ ✦ ✦

No. 1,943,977, INSULATED CONDUCTOR, Patented January 16, 1934, by Joseph A. Kennedy, Pawtucket, R. I., assignor to Anaconda Wire and Cable Company, New York, N. Y., a corporation of Delaware.

No rubber insulation is employed in this conductor. A number of independent varnish impregnated wrappings of paper are wound about the wire core and are adhesively united. There is an outer finish coating of lacquer on the outermost wrapping, with the wrapping being non-adherent on the core so that the wrapping may be easily stripped therefrom.

✦ ✦ ✦

No. 1,944,003 and 1,944,004, ELECTRIC CABLE, Patented January 16, 1934, by William A. Del Mar, Greenwich, Conn., assignor to Habirshaw Cable and Wire Corporation, New York, N. Y., a corporation of New York.

The inventions lie in the provision of oil channels so disposed that the cable may be coiled and straightened without disrupting the covering.

✦ ✦ ✦

No. 1,944,142, MACHINE FOR WRAPPING WIRES, Patented January 16, 1934, by Adrian O. Abbott, Jr., Grosse Pointe Park, and George K. McNeill, Detroit, Mich., assignors to Morgan & Wright, Detroit, Mich, a corporation of Michigan.

More specifically, the machine is adapted for placing a paper ring around the ends of rings of wire used in making beads for tires.

✦ ✦ ✦

No. 1,944,273, LUBRICATING COMPOUND, Patented January 23, 1933, by George Stanley Rutherford, Riverside, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

This lubricating compound is stated to be particularly adapted for wire drawing and comprises about one part of a soluble alginate (preferably sodium alginate), four parts of Tallow, two parts of soap and one hundred and ninety-five parts of water.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

No. 1,944,581, COIL WINDING MACHINE, Patented January 23, 1934, by Edward Snyder, Fort Wayne, Ind., assignor to General Cable Corporation, New York, N. Y., a corporation of New Jersey.

The invention covers control means for a coil winding machine.

✦ ✦ ✦

No. 1,944,634, CABLE, Patented January 23, 1934, by Carl P. Brodhun, Wilkes-Barre, Pa.

This cable dispenses with the customary metallic protective sheathing and winding without, however, losing its ability against weathering.

✦ ✦ ✦

No. 1,944,786, PAPER WIRE ROPE CENTER, Patented January 23, 1934, by Milo C. Dodge, Auburn, N. Y., assignor to Columbian Rope Company, Auburn, N. Y., a corporation of New York.

This wire rope center is composed essentially of a number of paper units, one of the units constituting a covering for the remaining units, with the remaining units being individually twisted in one direction and the covering unit being spirally wrapped around the remaining units in the opposite direction and so constituting a tubular casing for the enclosed units.

✦ ✦ ✦

No. 1,944,822, METHOD AND MACHINE FOR COATING CABLES, Patented January 23, 1934, by William W. Church, Stratford, Conn., and William C. Robinson, Sewickley, Pa., assignors to National Electric Products Corporation, New York, N. Y., a corporation of Delaware.

This machine is provided to apply a stearin pitch coating to asphalt-saturated fibrous covering of insulated wire, the arrangement of the machine being such as to minimize the tendency of the asphaltic saturant to remelt and run into the pitch during application of the pitch.

✦ ✦ ✦

No. 1,945,764, HIGH TENSION SUBMARINE CABLE, Patented February 6, 1934 by George Zapf, Cologne, Germany, assignor to Felten & Guilleaume Carlswerk Actien-Gesellschaft, Cologne-Mulheim, Germany.

In the construction of this cable, the inventor eliminates lead sheating, using a rubber outer coating, freed of water soluble and water containing constituents, and adding a coating of paraffin to the rubber outer coat.

✦ ✦ ✦

No. 1,945,851, WIRE COATING MACHINE, Patented February 6, 1934 by Orville F. Freeland, Muskegon, Mich., assignor to Anaconda Wire and Cable Company, New York, N. Y., a corporation of Delaware.

More specifically, the invention relates to electric conductor wires covered by a coating of varnish or enamel, the machine being particularly adapted to provide a coating uniform in thickness.

✦ ✦ ✦

No. 1,946,190, CABLE, Patented February 6, 1934 by Carl P. Brodhun, Wilkes-Barre, Pa.

The construction of this cable comprises a wire conductor having a number of layers of insulating and waterproofing material about it, and strips of stiff bendable rubber compound having longitudinally arranged wires embedded therein and wound around the insulating material to armor the cable.

✦ ✦ ✦

No. 1,946,322, COMPOSITION FOR THE IMPREGNATION OF CABLE INSULATION, Patented February 6, 1934 by George F. Kennedy, Wilmington, Del., assignor to Hercules Powder Company, Wilmington, Del., a corporation of Delaware.

It is stated that this composition is particularly applicable to paper casings and comprises an unoxidized abietic acid and hydrocarbon oil. It is stated that the composition is an anti-sludge one.

✦ ✦ ✦

No. 1,946,331, INSULATED ELECTRICAL CONDUCTOR, Patented February 6, 1934 by Beauford H. Reeves, New Haven, Conn., assignor to Rockbestos Products Corporation, a corporation of Massachusetts.

The object of this invention is to provide a conductor incapable of evolving an inflammable or explosive gas at elevated temperatures, the wire conductor being insulated by a coating consisting principally of asbestos impregnated with sodium silicate, the concentration of the sodium silicate progressively decreasing from the interior to the exterior.

✦ ✦ ✦

Reissue No. 19,074, WOVEN WIRE CONVEYER BELT, Patented February 13, 1934 by Harold A. Wadman, West Hartford, Conn., assignor to Hartford-Empire Company, Hartford, Conn., a corporation of Delaware.

This belt assembly includes alternately arranged transversely disposed helical right and left hand wound wires with connecting wires interposed between and meshing with each turn of the other wire and so formed that when the conveyor is assembled for use it presents a supporting surface for ware made up of portions of the turns of all the wires.

✦ ✦ ✦

No. 1,946,870 HELICAL SPRING COILING DEVICE, Patented February 13, 1934 by William H. Moon, Muncie, Indiana.

In this spring coiling device a mandrel is provided having a larger diameter at one end than at the other with a sleeve surrounding the mandrel. Spring wire guided between the mandrel and the sleeve at the large end of the former and is wound about the mandrel by the sleeve which rotates.

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in Jan. 1934 and Jan. 1933
(In gross tons)

	Jan. 1934	Dec. 1933	Jan. 1933
Wire rods	7,011	3,210	711
Hoops, bands and strip steel	2,901	1,871	944
Plain black or galvanized iron or steel wire	3,518	3,346	390
Barbed wire and woven wire fencing	2,325	3,545	892
Woven wire screen cloth	36	98	40
Wire rope	284	232	107
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	470	316	173
Wire nails	866	1,115	601
Tacks	30	43	30
Other nails, including staples	213	272	121
Bolts, machine screws, nuts, rivets and washers	424	441	185
Total, these 11 classifications	18,078	14,489	4,194

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Concrete Reinforcement bars	46	116	266
Hollow bars and drill steel	61	102	87
Merchant steel bars	1,033	2,082	1,664
Wire rods	747	1,143	1,196
Barbed wire	1,549	1,385	1,717
Round iron and steel wire	258	192	155
Telephone and telegraph wire	1	1	16
Flat wire and strip steel	49	134	65
Wire rope and strand	145	201	127
Other wire	2	111	225
Hoops and bands	823	1,267	1,445
Nails, tacks and staples	605	324	1,007
Bolts, nuts and rivets	28	27	20
Total, these 13 classifications	5,347	7,085	7,990

Exports of Insulated Wire and Cable

JANUARY, 1934

	Lbs.	Value
Insulated iron or steel wire and cable	1,103	$ 236
Rubber covered wire	229,609	47,241
Insulated copper weatherproof wire	167,956	23,726
Wire and cable telephone cable	5,321	1,324
Other insulated copper wire	197,576	45,080
Nickel-Chrome Electric	46,419	40,452
Total, these 6 classifications	647,984	$158,069

* Does not include shipments made to Alaska, Hawaii or Porto Rico.

EXPORTS of iron and steel products in January, 1934 totaled 178,023 gross tons.

✦ ✦ ✦

BY comparison with the export trade of January, 1933, the 1934 exports were more than three times as great.

✦ ✦ ✦

IMPORTS were sharply reduced, totalling 22,653 tons which was the smallest import trade for any single month since March, 1933.

✦ ✦ ✦

THE decline in the export trade was entirely in shipments of scrap iron and steel, this decline being more than double the drop in the total exports.

✦ ✦ ✦

WIRE rods doubled considerably their export strength.

✦ ✦ ✦

THE drop in imports resulted from reductions in such items as pig iron, ferro-manganese and structural shapes.

✦ ✦ ✦

THE month's principal market for exports was Japan, whose total of 64,417 tons included 51,765 tons of iron and steel scrap and 5,734 tons of wire rods. The United Kingdom took 17,682 tons of scrap, the other major item being hoops with 409 tons. Among Canada's purchases during the month were 2,081 tons of steel bars and 1,348 tons of cold rolled strip steel. China purchased 1,236 tons of scrap, 1,120 tons of wire rods and 5,382 tons of tin plate.

✦ ✦ ✦

AMONG the imports during January an unusual note was sounded by the receipt of 5 tons of welded pipe from Japan.

✦ ✦ ✦

BARBED wire, amounting to 1,549 tons was imported principally from Germany, while all of the scrap received, amounting to 1,160 tons came from Canada. The bulk of the merchant steel bars received, amounting to 1,033 tons came from Belgium (620 tons) and Sweden (260 tons).

✦ ✦ ✦

EXPORTS of iron and steel wood screws during January totaled 39,613 gross, valued at $8,236. Of this total the United Kingdom took 9,583, valued at $4,792; Mexico, 4,281 valued at $240; Uruguay, 6,461 valued at $572; Cuba, 3,892 valued at $359; China, 3,000 valued at $300; Venezuela, 2105 valued at $304; Ecuador, 2,250 valued at $266.

✦ ✦ ✦

EXPORTS of brass wood screws totaled 6,713 gross valued at $1,914. Of this amount Uruguay took 2,269 gross; Panama, 714 gross; Argentina, 826 gross; Philippine Islands, 540 gross.

✦ ✦ ✦

IMPORTS of wood screws during the same period amounted to nothing. There were none.

✦ ✦ ✦

Review of Recent Wire Patents

(*Continued from page 118*)

No. 1,947,974, APPARATUS FOR INSULATING AND WRAPPING TIRE HEAD WIRE, Patented February 20, 1934 by Harold A. Denmire, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio, a corporation of Ohio.

By the use of this apparatus, rubber tape is formed by passing regularly spaced parallel wires through an extruding machine and by which the tape is wrapped with an exterior holding strand.

✦ ✦ ✦

No. 1,948,241, ELECTRIC CONDUCTOR, Patented February 20, 1934 by Edwin J. Schneider, Jamaica, and Merritt B. Bradt, Brooklyn, N. Y., assignors by mesne assignments to General Cable Corporation, New York, N. Y., a corporation of New Jersey.

In this electric conductor the ground wire has a serpentine formation for rendering the ground flexible when subjected to transverse and longitudinal stresses.

✦ ✦ ✦

No. 1,948,664, CONTINUOUS WIRE-DRAWING APPARATUS, Patented February 27, 1934 by Charles D. Johnson, Worcester, Mass.

New means is stated to be employed for the purpose of applying dry lubricant (lime and soap) to the wire as it is being wound on the drum sections of the wire drawing apparatus.

'Round the World With the Wire Industry

British Improving Paper Cables

NOTEWORTHY technical developments resulting in the improvement of solid impregnated paper cables have been made in the United Kingdom during the past year or two. These improvements are the result of investigating the effects of using different papers, varying the impregnating media and changing the processes of impregnation. It has been proved that the use of cable dielectrics consisting entirely of oils or gases under compression is out of the question, but the utilization of paper as a supporting medium holds much greater promise.

✦ ✦ ✦

AN economical wood paper pulp can be produced for this type of work, and the fact that it is available with a breaking strain of about 18,000 lbs. per square inch indicates that it is a more attractive proposition to the cable maker than non-ferrous metal. Moreover, it is considerably easier to handle. Paper has shown itself to be thoroughly efficient in this capacity, provided it is enclosed and sealed between lead sheaths. It has also been demonstrated that, when paper is employed, and the compression of the gas-filling medium is raised, the electrical breakdown strength of the cable can be advanced by as much as 300 per cent. Research in this sphere of development is still in progress and, with improvements in the type of paper utilized, there can be little doubt that much greater increases in cable break-down strength are to be expected in the future.

✦ ✦ ✦

Wire Industry For Manchukuo

PLANS are being matured for a wire industry in Manchukuo, based on the Kishin Showa steel plant in Mukden. This plant is equipped largely with German machinery. So far as the plans have been made known they do not contemplate the immediate rolling of rods in Mukden but the production of wire and its derivatives from Japanese rods. It is true that Japan is at present an importer of rods but her own industry is being rapidly built up and it is believed that she would would take on this obligation.

✦ ✦ ✦

THE present idea is that the Kishin Showa plant will turn out barb fence, nails, and common round fence wire. The woven wire products are not in the immediate program. The considerable amount of construction work in railroads and tramways throughout Manchukuo will add greatly to its significance as a wire consumer.

✦ ✦ ✦

Straits Settlements Refusing Japanese Wire

IN the Straits Settlements a majority of the importers and merchants are Chinese, and a considerable number of them have refused in recent years to sell Japanese goods. In view of the fact however that other concerns were willing to engage in such business this gesture has been of no great significance. The picture is now changing. Recently a strong association of importers trading in the principal cities, Penang, Kuala, Lumpur, Ipoh and Singapore has come to an agreement to handle no more Japanese goods in many categories, among which are nails and other wire products.

✦ ✦ ✦

THIS measure was adopted on two grounds; first that the treatment of China by Japan had been such as to impose upon her sons living abroad the duty of reprisal where possible, and second that the quality of Japanese goods was decidedly irregular and that the shippers were usually deaf to complaints after the money had passed.

✦ ✦ ✦

THIS boycott may be of significance to other manufacturing countries. It is true that the Straits Settlements constitute a market of small consequence, but it must be remembered that a movement of this sort is very likely to spread to Siam, also that most of the merchants of Burma are Chinese and that in recent years the imports of Japanese products into Burma have been rapidly increasing. The Japanese have struggled hard to get business here in the woven wire products, but without success.

✦ ✦ ✦

IT must be noted however that earlier revolts against Japanese goods based on unfavorable terms have always failed. The Japanese require cash on delivery, in contradistinction to the long terms granted by Germany. Japan's low prices have surmounted this obstacle.

✦ ✦ ✦

Wire Mill Planned For Hongkong

HONGKONG, a British Crown Colony located at the threshhold of Canton and in a strategic position with regard to South China trade, with an excellent harbor, and secure from the exactions of bandits and War Lords, offers many advantages to industry, and industry has not been backward in accepting them. Word now comes from Hongkong that an unnamed British wire company is planning to build a branch plant there, primarily for wire nails, bringing equipment both from Europe and the United States. The wire will be made from imported rods.

Since however Hongkong is a "free port" and levies no import duties it is not clear whether the scheme will be profitable, as the market will naturally be sought in South China.

✦ ✦ ✦

BRITISH wire goods have always been high priced but it has always been conceded that their quality was also high, and British goods have always commanded a

certain market on that account. Recent improvement in the domestic market together with extensions of the export field have seemingly resulted in a distinct falling off in quality, in so marked a degree that the circumstance can hardly be argued. Complaints are more often heard, and in adjudication proceedings the shippers have been consistent losers.

✦ ✦ ✦

MR. JOHN A. MILNE, chairman of the Council of the Royal Society of Arts has made interesting comments on this situation. He asserts in a recently published booklet, reinforced by numerous examples, that British quality is definitely falling off. He names the wire products specifically.

✦ ✦ ✦

THIS charge has naturally brought out strong protests from manufacturers. In spite of general denials however they admit it has seemed necessary to offer cheap goods in certain lines to meet competitive prices, and that these goods frankly are of second quality. Mr. Milne retorts that while this may be justifiable, the fact remains that these low grade products constitute a fraction of the whole which is steadily increasing from month to month.

✦ ✦ ✦

Zinc Cartel Extended

THE International Zinc Cartel, at its assembly in Ostende, decided to continue its organization and activities one year, that is to the end of July, 1934. The producers have the right to denounce the contract after October, 1933, on three months notice, although it is considered improbable that any of them will make use of this right after the favorable results thus far obtained.

✦ ✦ ✦

THE stocks of the cartel, which attained 206,000 tons in July, 1931, and only 137,600 tons at the end of May, 1933, declined again by 7,000 tons in June, representing only 25 per cent of the current production, so that the producers in the various countries are unable to cover the consumption. Consequently it was decided to raise the production quota 45 to 50 per cent to permit the members of the cartel to increase their production by 56,000 tons total annually.

✦ ✦ ✦

Steel Company of Canada To Extend Several Departments

AS a result of the improvement in demand for its various commodities the Steel Company of Canada, Ltd., Hamilton, Ontario, has announced plans for an addition to its plant to be started immediately. Two buildings will be erected. Plans call for the extension of the wire department and the ingot mould building, to cost $160,000. These additions have been authorized by directors following a sharp increase in business lately which has resulted in orders falling far behind schedule.

✦ ✦ ✦

Dissolution of Polish Wire And Nail Syndicate

DISCUSSIONS were held recently between representatives of the large Polish wire and nail factories regarding the conclusion of a Syndicate agreement. Since no results were obtained from the negotiations the three-month trial agreement concluded between three leading factories in October, 1933, was terminated.

✦ ✦ ✦

Competition In Screening In The Philippines

COMPETITION from Japan and Germany in the Philippine market for wire screening has become extremely keen and at present quotations American goods will find great difficulty in maintaining their position in the market. Local preference is for the standard 36 inch by 100 foot (300 sq. ft.) roll of black iron, green-painted wire screening, although a limited quantity of galvanized screening is in demand. Very little copper screening is used. Of that sold about 70 per cent is No. 12 mesh and the balance (30 percent) is of Nos. 14 16 and 18 mesh. Current prices (as of January 2d, 1934) for No. 12 mesh green-painted screening were P 8.51 (U. S.), P 7.00 (Japan), and P 7:50 (Germany) per roll of 300 square feet laid down in Manila—duty paid in the last two instances. Japanese and German screening of 14, 16 or 18 mesh was not in the market in substantial quantities at the time of reporting although orders were being taken for spring delivery—presumably at prices under those prevailing for these sizes of screening—P 10.71, 12.29, and 14.18 respectively. In most cases the Japanese and German wire screening carry ambiguous trademarks, and it was noted that in practically every Chinese store where either the Japanese or German screening is handled the rubber stamped "Made in Japan" or "Made in Germany" and, frequently, the name of the manufacturer, is more or less obliterated from the end tag.

✦ ✦ ✦

Maurice Bekaert

MAURICE BEKAERT, for some years managing director of Trefileries Leon Bekaert, Sweveghem, Belgium, a wire mill which was founded by his father in 1880, has recently passed away.

✦ ✦ ✦

HIS death occurred at his home in Courtrai on Dec. 20, after an illness of about two months. He is survived by his parents, a brother and a sister, and by his wife and three daughters. Mr. Bekaert fought in the Ypres sector from 1914 to 1918 as an officer of the Belgian army and was awarded the Croix de guerre. He was widely known as one of the most progressive of the wire manufacturers of Europe and his mill was one of the most completely "rationalized" to be found in any country. He visited this country in 1926.

The Control of Industrial Research

INDUSTRIAL research has been a major contributing factor in reducing the cost of production and in developing business through new or improved products, or through new uses for old products. If properly directed and controlled, according to a new report of the Policyholders Service Bureau, Metropolitan Life Insurance Company, it is recognized as a sound investment for an industrial organization. Forty-five prominent manufacturing organizations contributed the data that is contained in this report, which is entitled **The Control of Industrial Research.** The material deals with the organization and administration of an industrial research department.

✦ ✦ ✦

FOLLOWING a discussion of the organization of a research department of this type, and of the origin and authorization of research projects, the report considers the question of cost estimates. Several of the 45 companies stated, according to the report, that the preparation of estimates of research projects is hardly practicable, but 23 others reported that they prepared cost estimates for each project. Twelve of these prepare their estimates in terms of labor, material and overhead; five in terms of labor and materials cost only; six lump their cost into one figure. Of the nineteen companies that do not prepare estimates on all projects, several prepare estimates for the larger and more extensive projects. In this connection the report reproduces a "Production Development Summary" form that is used by one manufacturer in authorizing development work and in estimating its costs.

✦ ✦ ✦

METHODS used by these 45 manufacturers in setting up the research budget are outlined in some detail. "The methods of budgeting in use," states the report, "show considerable variation. In some organizations the budget is prepared in great detail for each of the various projects to be undertaken. In other companies the budget is fixed as a lump sum to cover labor, materials and supply expenditures and is used primarily as a guide to assist in keeping expenses within bounds."

✦ ✦ ✦

THE other sections of the report consider standardized research procedure, cost keeping and control, and the review and reconsideration of research projects. A limited supply of copies of **"The Control of Industrial Research"** is available; copies may be secured by addressing the Policyholders' Service Bureau, Metropolitan Life Insurance Company, 1 Madison Avenue, New York, N. Y.

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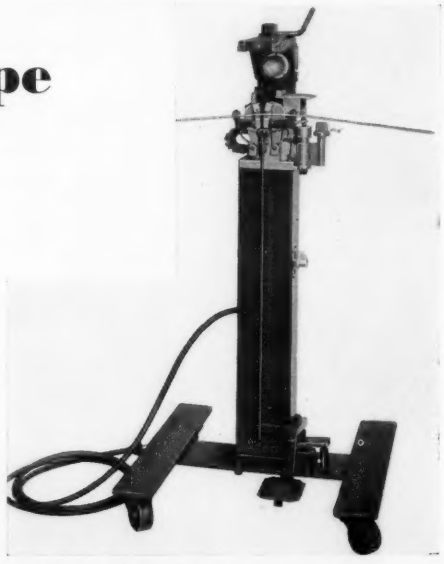


MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO, ILL.

Telephone State 7468 **General Offices and Factory, Peoria, Ills.**

Successful Safety Practice

(*Continued from page 116*)

the bulbs to provide a coating for photoflash lamps, the equipment is provided with protect-to-seal, an anti-flash-back shield. The equipment is grounded and isolated in a totally enclosed room, which is provided with spring type explosion proof windows.

✦ ✦ ✦

ANOTHER feature of interest, presenting some elements of safety, is the mechanical dipping machine, which replaces hand dipping of bases. Formerly, in the hand dipping operation, there were a series of five tanks arranged in a "U" shape for a pickling process and acid dip, and three water baths. The parts to be dipped were placed in a metal basket about 24″ by 18″ and dipped in each tank separately.

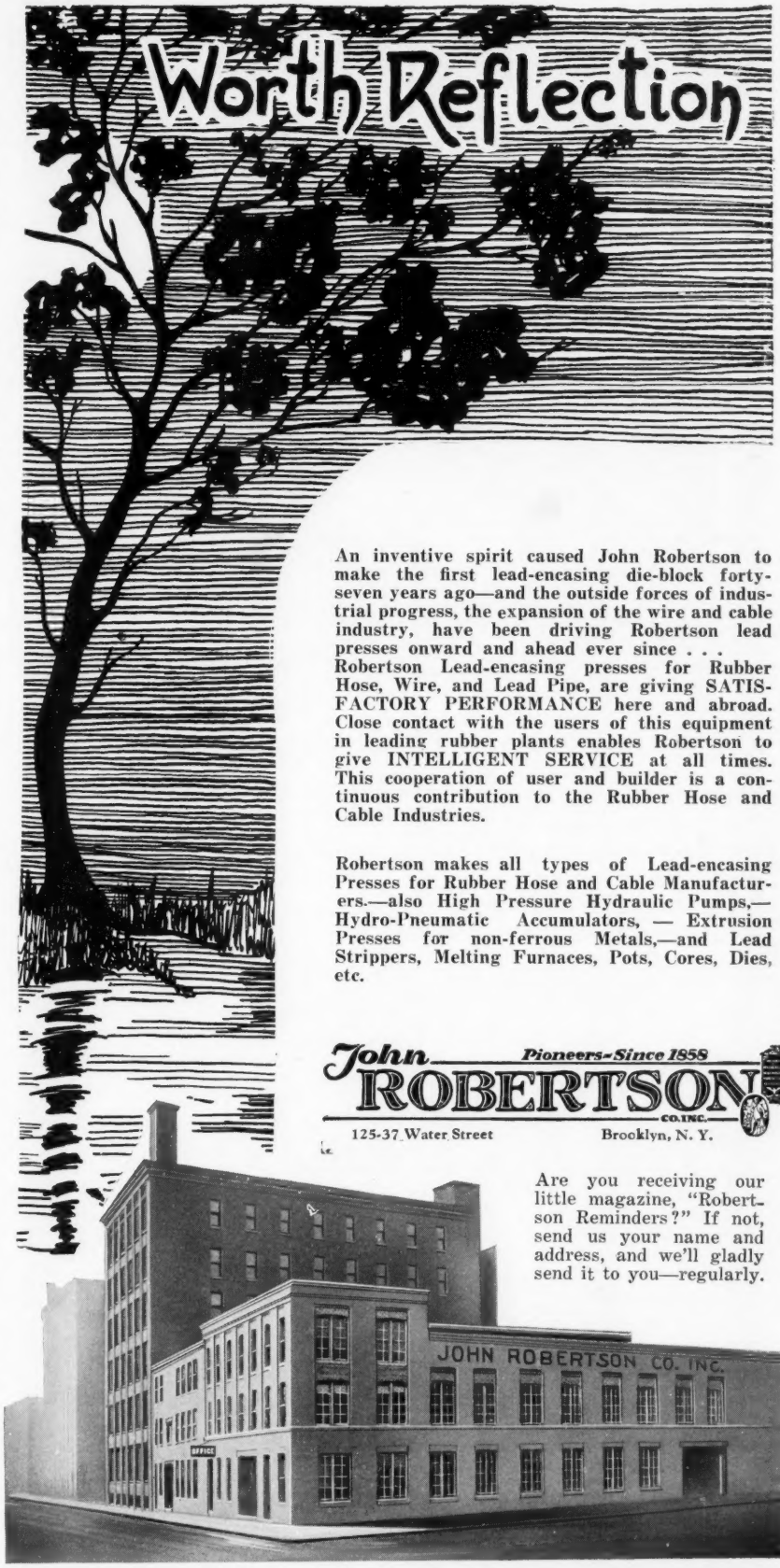
✦ ✦ ✦

THE new mechanical dipping process saves the employes from all exposure to splashing acids. The bases are placed into a mechanical dipper at one end and fall out into a hopper at the other end. By means of a window in the mechanical dipper, the operator can observe the operation with safety.

✦ ✦ ✦

ON the operation known as the characteristic test (general observation test) of 20 K. W., transmitting tubes, requiring 18,000 volts D. C., knife breakers incased in a door switch turn the power off when the door is open. Door switches of the button type were formerly used but these failed to operate sometimes. With the present set-up, which is also used on sets requiring 100,000 volts, the operator must first pull the knife switch, which is built in the door, before the door will open. A wiping device is fastened to the door of the test cage so that the condenser voltage is killed when the door is opened. A knife switch encased on the door of the cage serves as an interrupter of the main power line when the cage door is opened.

(*Please turn to page 124*)



An inventive spirit caused John Robertson to make the first lead-encasing die-block forty-seven years ago—and the outside forces of industrial progress, the expansion of the wire and cable industry, have been driving Robertson lead presses onward and ahead ever since . . . Robertson Lead-encasing presses for Rubber Hose, Wire, and Lead Pipe, are giving SATISFACTORY PERFORMANCE here and abroad. Close contact with the users of this equipment in leading rubber plants enables Robertson to give INTELLIGENT SERVICE at all times. This cooperation of user and builder is a continuous contribution to the Rubber Hose and Cable Industries.

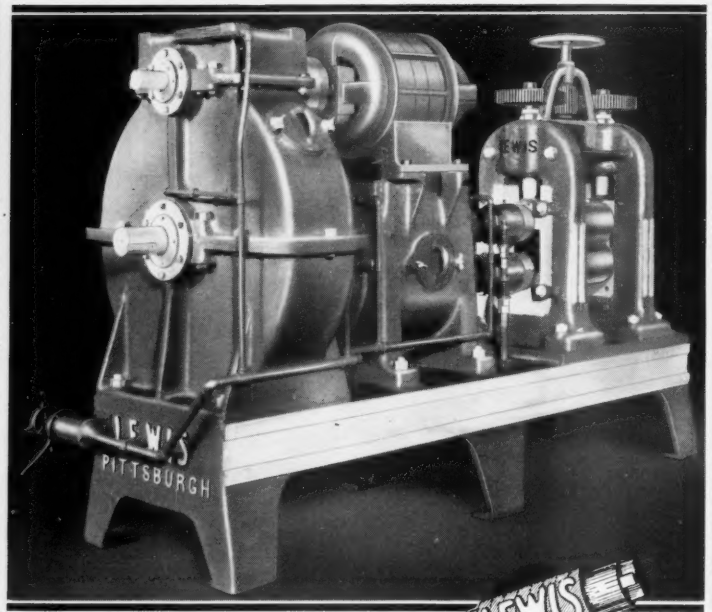
Robertson makes all types of Lead-encasing Presses for Rubber Hose and Cable Manufacturers.—also High Pressure Hydraulic Pumps,—Hydro-Pneumatic Accumulators, — Extrusion Presses for non-ferrous Metals,—and Lead Strippers, Melting Furnaces, Pots, Cores, Dies, etc.

John ROBERTSON CO. INC. *Pioneers-Since 1858*

125-37 Water Street Brooklyn, N. Y.

Are you receiving our little magazine, "Robertson Reminders?" If not, send us your name and address, and we'll gladly send it to you—regularly.

LEWIS WIRE FLATTENING AND NARROW STRIP MILL



Unit Construction.

Lewis Cut Herringbone Gear Reduction Unit directly connected through a flexible coupling.

Forged Steel Pinions.

Bearings are lubricated by compression grease cups.

All gears run in oil.

Neck Bearings are die cast genuine babbitt or roller bearings.

Housings have T slots for attaching coilers and guide bars.

This Mill is built in a complete unit and can be moved at any time to any desired location in the plant. The rolls may be of any quality specified by customer, including hardened steel rolls, or water cooled rolls.

• • •

LEWIS MAKES A COMPLETE LINE OF ROLLING MILL MACHINERY INCLUDING:

Mill drives up to and including 6,000 HP. Shape Straightener Machines up to and including 24 inch I beam. Motor operated Screw-Down for Mill. High Speed Gear Sets for Continuous Rod Mills. Continuous Bar and Billet Mills. Cold Mills for Sheet and Strip. Rail Breakers. Rail Re-Rolling Mills. Universal Mill Spindles. Chilled Iron and Iron Alloy Rolls for Iron, Steel, Brass, Copper, Aluminum, Zinc and Nickel. For hot Sheets, tin plate and strip—for cold sheets, tin plate and strip. For merchant bars and rods, Shears—Vertical Alligator—Cropping—Plate and Squaring. Special Machinery—Testing Machines and Iron and Steel Castings.

P. O. BOX 1591, PITTSBURGH, PA.

LEWIS FOUNDRY & MACHINE CO.

Successful Safety Practice

(*Continued from page 123*)

IN the past few years our accident prevention work has dealt largely with the establishment of safe practices in a fairly static working operation. We have been successful in achieving results well-nigh approaching a limit in practical safety. Now that a returning prosperity has stepped up manufacturing considerably, we are confronted with the teaching of safety to an increasing payroll. Better times may also mean more new products which will often require different manufacturing processes and introduce new safety problems.

✦ ✦ ✦

Frank Quinn, Former Editor "Wire & Wire Products" Dead

FRANK QUINN, 44, former editor of "Wire and Wire Products" passed away recently at the New Haven, Conn., Hospital after an illness of two years. He leaves his mother, a sister and three brothers.

Since his health began to fail, Mr. Quinn has lived in Wallingford, Conn., his birthplace.

✦ ✦ ✦

AFTER attending Clark University he became editor of "The Wallace", published by R. Wallace & Co., Wallingford, Conn.

Later in New York he had been many years with the Butterick publications where he was successively editor of Everybody's Magazine, Adventure and the Delineator. His last connection was as editor of "Wire and Wire Products".

✦ ✦ ✦

G. A. BAKER, formerly manager of the Buffalo Office, has been transferred to the General Offices of The Duriron Company at Dayton, Ohio, where he will specialize on sales of Durimet and Durco Alloy Steels.

✦ ✦ ✦

COLONEL M. W. SMITH of the General Offices, has taken over temporarily the management of the Buffalo Office.

Alloy Steel Fan Resists Extreme Heat of Furnace

BY using the same scientific care and precision that a pharmacist employs in filling a prescription, the National Alloy Steel Company, a subsidiary of Blaw Knox, Pittsburgh, Pennsylvania, is furnishing steel mills and other metal trades a variety of alloy steel castings to meet a score of needs.

✦ ✦ ✦

KNOWING the maximum temperature; the kind of fuel, particularly as to its sulphur content; the load to which castings are to be subjected, and the time under load, the proper alloy can be recommended for any given set of conditions.

✦ ✦ ✦

FOR instance, a fan to equalize temperatures and increase capacity in continuous heating furnaces must have great strength at high temperatures. National Alloy Steel Company recently perfected such a fan. Tests prove it resists oxidation up to 2000 degrees, Fahrenheit, and offers high resistance to abrasion under that heat. Fuel of high sulphur content has no detrimental effect on this new item.

✦ ✦ ✦

ALLOY skids are now being used in continuous furnaces for heating billets, slabs and bars before rolling and make possible a shorter "hot hearth" than can be obtained with other types of skids. Greater strength makes light cross sections practicable and the hardness of alloy resists wear to the extent that shutdowns for replacements are greatly reduced.

✦ ✦ ✦

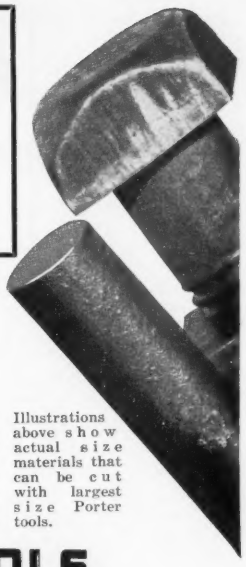
NORMALIZING furnace shafts and discs, hearth plates, rails and rollers, track shoes, annealing boxes and lead pots for wire and strip are a few more items for which National Alloy castings are being used in heat treating and furnace equipment of steel plants.

✦ ✦ ✦

IT is further stated that comparatively new and highly specialized materials in the form of alloy castings have additional applications in the pickling process, in preheaters, soaking pits, heat exchangers, recuperators and blast furnaces. Scores of other uses have been developed for specific locations where unusual operating conditions must be met.

SPECIAL JAWS *for* SPECIAL NEEDS

✦

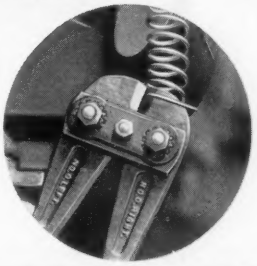


Illustrations above show actual size materials that can be cut with largest size Porter tools.

PORTER HKP *portable* *two hand* **CUTTING TOOLS**

Cutters for soft wire, spring wire, tempered wire, piano wire, stranded guy wire, wire rope and cables, insulated wires, live wires, etc., as well as for bolts, rods and bars.

Write for illustrated circular. Porter Tools are sold by leading jobbers and supply houses.



H.K.PORTER INC. Everett, Mass.

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Before disclosing your inventions to anyone send for blank form "Evidence of Conception" and instructions "How to Establish Your Rights".

All cases submitted given personal attention by members of the firm. Information and booklet free.

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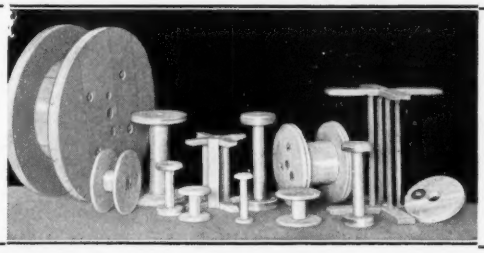
Suite 438, 815-15th St., N.W. Washington, D. C.

WOODEN SPOOLS ROLLS and BOBBINS For WIRE and CORDAGE MILLS



WRITE FOR PRICES

✦ ✦ ✦

AVOCA MFG. CO. AVOCA, N.Y.

The Law of Economics hasn't been repealed

You still have to pay more for doing things your own way, if there is a better and cheaper way of doing them.

Take unloading a tank car of sulphuric acid for instance. Here is an actual case:

To unload a tank car by air pressure took about seven hours and required that two men be on duty, watching, all that time.

With a Duriron No. 2E Centrifugal Pump, a tank car now is unloaded in 1½ hours at the most. And so far as the operation is concerned, no one need watch it.

Now, where's the percentage in using air?

And, as an extra dividend declared whenever you use it, A Duriron Unloading System will be safe—no danger of explosions.

You can't laugh off Economy and Safety these days.

Let us give you some more information on this—just write

The Duriron Company, Inc.,

442 N. FINDLAY ST., DAYTON, OHIO

Promote increased die-life in Wire Drawing by using

Bell-Mine Pulverized Lime

●

For years this lime has given satisfaction in regular use. Names of plants and experienced users will be given gladly on request.

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AMERICAN LIME AND STONE CO.

(OPERATING UNDER N. R. A. LIME CODE)

PLANT and EXECUTIVE OFFICE: BELLEFONTE, PA.

Sales Offices: PITTSBURGH PHILADELPHIA NEW YORK CITY

Bell-Mine Products

Seams for Fourdrinier Wires

(*Continued from page 117*)

weft wire removed is a normal wire but the last weft wire of the other end of the fabric, around which the projecting warp wires are to be bent, is a smaller and stiffer wire. When the warp ends have embraced this wire and been rolled down and soldered, this joint is actually a little depressed with reference to the general surface, and is consequently subject to less wear than the fabric. This small common weft wire must be of at least the same hardness as the warp wires to which it is soldered.

✦ ✦ ✦

IT will be noted that on account of the small size of the common wire at the joint the warps can be brought into perfect alignment if desired, a result not possible in the Nos. 20 and 21 seams.

✦ ✦ ✦

ANOTHER point of advantage is this, if the welding or soldering is bungled in any way the joint can be cut out, a small wire slipped into place between the warp ends, the opposing warp wire removed, and a new joint made.

✦ ✦ ✦

PHOTO 22 shows the various steps in the preparation of this seam, and the finished joint with warp wires in alignment.

✦ ✦ ✦

Special Seam No. 23

AN ordinary soldered seam has the disadvantage of presenting a considerable area of non-draining surface. The use of a closing wire also interferes measurably with the uniformity of drainage, besides making a joint that is more flexible than the fabric itself. The closing wire also projects above the general surface, and furthermore puts undue strain on the last weft wires.

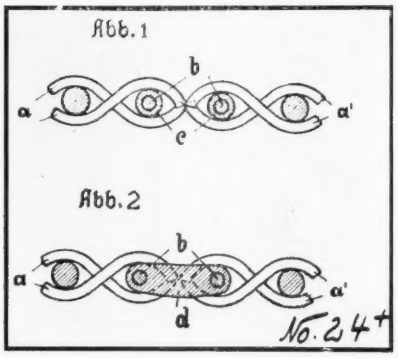
✦ ✦ ✦

SEAM No. 23 overcomes these weaknesses. The last weft wires at both ends of the fabric are special wires covered with solder-

Seams for Fourdrinier Wires

(*Continued from page 126*)

metal, generally tombak wires with a silver-solder cover. The fabric is mounted in a fixture which has steel plates to cover the other parts while a soldering torch is run along the end wires, securing the warp ends to the special weft wires. Borax is used as a flux. Dr. Th. Wieland, Pforzheim (Germany) supplies these solder-covered wires, as well as special fluxes. This joint is finally laced up with a closing wire.



Special Seam No. 24

THE joint just described shares in some degree the weakness of all laced joints. The seam shown in photo 24 however, avoids it entirely. In this seam the last weft wire at each end of the fabric consists of a core of high melting metal surrounded by a solder jacket. The fabric ends are brought together and the solder wires are fused. This produces a narrow soldered seam which does not appreciably affect drainage, nor is there any projection above the general surface nor any material change in flexibility at the joint. Photo 24 shows the operation clearly.

✦ ✦ ✦

J. E. Bruce, Secretary Wheeling Steel Company

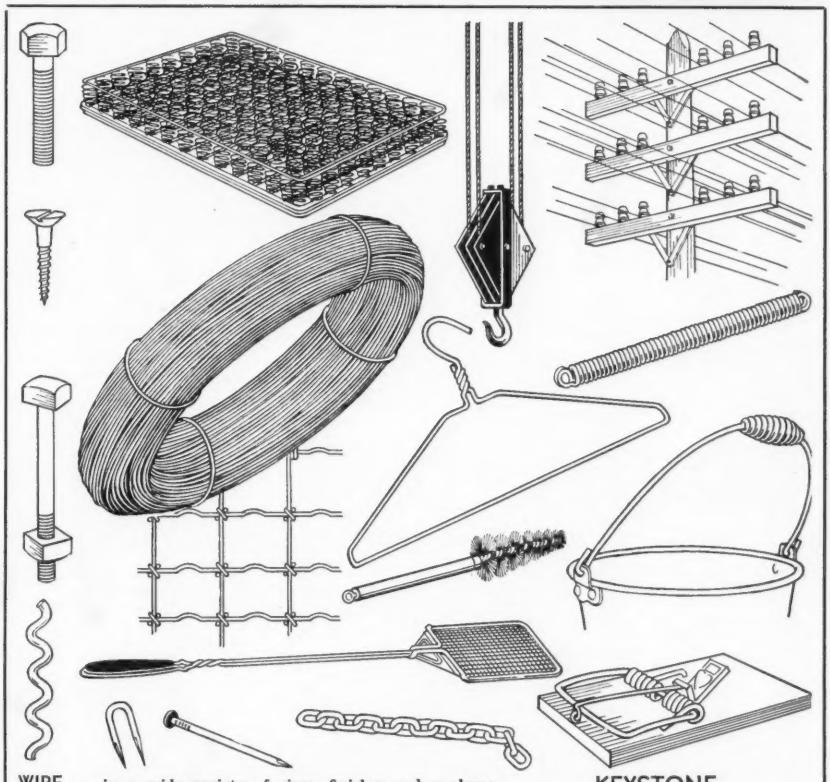
HOWARD P. BESWICK has resigned as secretary of the Wheeling Steel Corporation because of ill health. J. E. Bruce is to be his successor.

Learn about PARALAN

Paralan will give your finished wire and wire products protection from atmospheric corrosion in the mill and in shipping. Paralan-coated wire can be spot welded or soldered without cleaning. Also, Paralan leaves surfaces in good condition for all types of finishes—enameling, japanning, lacquering, plating, etc.

Write for further information. We may be able to solve your difficulties.

AMERICAN LANOLIN CORP.
LAWRENCE, MASSACHUSETTS



WIRE . . . in a wide variety of sizes, finishes and analyses for the manufacture of products that require a special wire. Your inquiry will receive the careful attention of an organization experienced in furnishing uniform high quality wire that improves your product and reduces its cost.

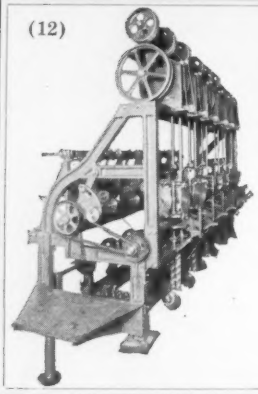
KEYSTONE STEEL & WIRE CO.
PEORIA, ILL.

German Manufacturer Of Machinery offers for sale

their U. S. A. Patents Nos. 1,861,563 and 1,924,839 relating to:
HIGHEST CAPACITY CONTINUOUS WIRE DRAWING MACHINES
which are unsurpassed in their high production and economy of operation. They will be sold outright or granted on license.

Please address reply to M. H. 313, this magazine.

(12)



VERTICAL MODEL TAPING MACHINE

for applying 3 Tapes on each six lines of wire, for flat or round conductor, with wire straightening rolls and individual traverse for each line of wire; motor or belt drive.

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"American" INSULATING MACHINERY COMPANY
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PHILADELPHIA PENNSYLVANIA U.S.A.

NEW ENGLAND BUTT COMPANY
ESTABLISHED 1842
BUILDERS OF
Insulated Wire Machinery
Write for catalog
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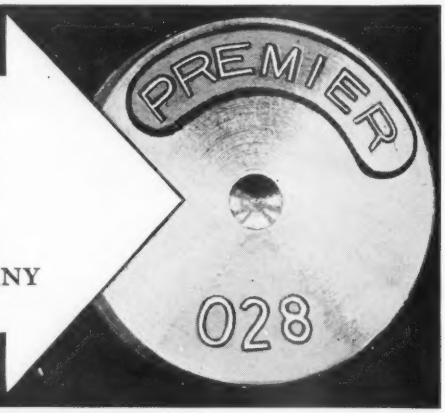
PROVIDENCE, R. I.
CHICAGO OFFICE
20 NORTH WACKER DRIVE

"PREMIER"
Trade Mark Reg. U. S. Pat. Off.
Diamond Dies
made by
DRIVER-HARRIS COMPANY
Harrison, N. J.



STILL SERVING THE WIRE INDUSTRY
AS ONLY A PIONEER CAN
WIRE DRAWING SOAPS
FOR EVERY PURPOSE
THE J. T. ROBERTSON CO., INC.
SYRACUSE, N. Y.

Farrel-Birmingham Annual Meeting

THE annual stockholders' meeting of Farrel-Birmingham Company, Inc., was held at the main office of the company at Ansonia, Conn., February 15, 1934. The following directors were re-elected: Charles F. Bliss, Henry F. Wanning, Franklin Farrel, Jr., Nelson W. Pickering, Frederick M. Drew, Jr., David R. Bowen, Carl Hitchcock, Franklin R. Hoadley, Armin G. Kessler, Walter Perry, Julius G. Day, Fernley H. Banbury, William B. Marvin, Edward H. Green, William A. Gordon, Alton A. Cheney, Geo. C. Bryant.

Following the stockholders' meeting the Board of Directors met and re-elected the following officers: Franklin Farrel, Jr., Chairman of the Board of Directors; Nelson W. Pickering, President; David R. Bowen, Vice President; Carl Hitchcock, Vice President; Franklin R. Hoadley, Vice President; Armin G. Kessler, Vice President; Frederick M. Drew, Jr., Treasurer; Laurie K. Blackman, Assistant Treasurer; George C. Bryant, Secretary; William B. Marvin, Assistant Secretary.

✦ ✦ ✦

Dana Summers was elected President of the Chicago Steel and Wire Company at the annual shareholders' meeting in Chicago, on March 6th. Loren F. Collins was elected Vice President, A. W. Nelson, Secretary and Treasurer, and H. E. Johnson, Assistant Secretary and Assistant Treasurer. H. R. Bliss, A. T. Carton, L. F. Collins, T. J. King and Dana Summers, were reelected as Directors.

✦ ✦ ✦

THE National Standard Company, of Niles, Mich., has purchased the equipment of the Worcester Wire Works, Inc., of Worcester, Mass. The plant will be operated there as a separate unit of the National Standard Company, and will be known as the Worcester Wire Works, branch of the National Standard Company. W. F. Parkin, president of the National Standard Company, returned to Niles this week after closing the deal in the Massachusetts city.

Testing Dielectric Strength

AN entirely new instrument has been developed for testing the dielectric strength (insulating value) of sheet materials such as plain paper, gummed or varnished paper, cloth, varnished cambrics, rubber, mica and other insulating materials.

Means are also provided for testing complete units such as transformers, coils, insulated wire, etc.

THE determination of the Dielectric strength of an insulating material requires that a sample be placed in an electrical field of sufficient intensity to disrupt or break down the molecular structure of the material under test. This frequently requires voltages high enough to endanger the life of the person or persons engaged in making the tests. This rather serious hazard, together with the technical difficulties involved in accurately measuring the voltage at the point of breakdown, makes it necessary to have highly specialized and carefully engineered apparatus, incorporating the following features. (1) Absolute safety to the operator, (2) Accuracy, (3) Smooth, convenient control of voltage from 200 to 10,000 volts, (4) Definite pressure and even distribution of the electrical field over the sample, (5) It should possess the simplicity of operation and rugged construction requisite in Industrial usage. This Dielectric Strength Test Set is designed to meet all of these requirements.

BISCO
TUNGSTEN CARBIDE DIES
FOR
WIRE, ROD and TUBING
BARE NIBS—SEMI-FINISHED—FINISHED
ROUND AND SPECIAL SHAPES
THE BISSETT STEEL COMPANY
CLEVELAND
WORCESTER BUFFALO CINCINNATI

BALLOFFET
The Quality Diamond Dies
1870 1934
BALLOFFET DIAMOND WIRE DIES CO. INC.,
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Factories in France: Lagnieu-Cluses-Trevoux

EFFICIENT PICKLING
REQUIRES "RODINE"
RODINE, SAVES ACID AND METAL.
Prevents over-pickling. Minimizes acid brittleness and acid fumes.
Samples and Directions sent on request.
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AMBLER, PA.
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ZINC STRIP
WIRE
THE PLATT BROS. & CO.
WATERBURY, CONN.

"DOING
ONE BIG
THING WELL"
NEP. 100%
INHIBITORS
The WM. M. PARKIN CO.
PITTSBURGH, PA.

New HOTEL EDISON
47th ST.
JUST WEST of B'WAY
NEW YORK
1000 ROOMS
EACH WITH BATH AND SHOWER
Circulating Ice Water . . . Radio . . .
Large Closets . . . Full Length Mirrors
OTHER UNUSUAL FEATURES
SUN-RAY HEALTH LAMPS
Roof Solarium . . . Air-Cooled Restaurant
ROOMS from $2.50 SUITES from $6.00
IN THE HEART OF TIMES SQUARE

MY experience, covering an active life, is this: Settle down to some worthy service and stick until success comes.

W. H. SPOWERS, JR.

Flat Wire Straightening and Cutting Machines
✦ ✦ ✦
Wire Straightening and Cutting Machines
✦ ✦ ✦
Welding Wire Machinery
✦ ✦ ✦
Portable Wire Straighteners
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Steel Reels of All Kinds
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Wire Mill Equipment, Stranding, Insulating, Drawing, Welding
Thomson-Judd Wire Machinery Co.
Subsidiary of
Thomson-Gibb Electric Welding Co.
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VIANNEY
Famous Wire Drawing Diamond Dies
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PAPER CABLE FILLER
FOLDED PAPER FLATS
PAPER INSULATION YARNS
NATIONAL PATENT REED CO.
3rd & Somerset Sts. Phila., Pa.

Wire Association Meeting

THIS is the first meeting the Wire Association and the National Metal Congress and Exposition have held in New York City. The week of Oct. 1-5, 1934, has been selected as the date, and Commerce Hall in the Port Authority Bldg., at 14th St., and Eighth Avenue, has been chosen for the site of the Exposition.

The Board of Trustees of the American Society for Metals, under the auspices of which the Congress and Exposition are held every year, made these decisions at their latest meeting.

All exhibits will be located on one floor with 160,000 square feet of space available. There will be no restrictions as to floor loading or operation of exhibits.

"We have long wanted to have the Congress and Exposition in New York," W. H. Eisenman, Secretary of the Society said, "but until now no suitable building has been available.

"Definite arrangements have been made that rates for services and connections will be the same as those which our exhibitors have enjoyed in Cleveland, Detroit, and elsewhere."

Floor plans are now available.

RUESCH
Machinery For
Wire, Tube, And Brass Mills
409 Mulberry St., Newark, N. J.

Broden Construction Co.
Wire Mill and Cold Rolling Equipment
10255 Harvard Ave.
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WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames—16" Frames, 8" Frames —Take-Up Frames, Wire Pointers—Puller Tongs.
General Castings for Wire Mill use.
Circulars on Request.
E. J. Scudder Foundry & Machine Co.
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WIRE STRAIGHTENING AND CUTTING MACHINERY
FOR ALL SIZES, SHAPES AND KINDS OF WIRE
The F. B. Shuster Co.
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Straightener Specialists Since 1866

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MAKERS OF EXTRUDING MACHINES FOR COVERING ELECTRIC CONDUCTORS AND WELDING WIRE

Wire Drawing Diamond Dies
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BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ANNEALING FURNACES
See Furnaces—Various Headings

ANNEALING POTS AND BOXES
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.

CLEANING & PICKLING EQUIPMENT
Broden Construction Co., Cleveland, O.
Duriron Co., The, Dayton, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

COATING—Protective
American Lanolin Corp., Lawrence, Mass.

COILERS—Sheet and Wire
H. J. Ruesch Machine Co., Newark, N. J.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Cochaud Wire Die Corp., New York.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., N. Y.

DIES—Rod and Tube Drawing
Bissett Steel Co., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Bissett Steel Co., Cleveland, O.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Bissett Steel Co., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

ENGINEER—Consulting Wire Mill
Lewis, Kenneth B., New York, N. Y.

EYELETS—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FURNACES—Annealing
Electric Furnace Co., Salem, O.

FURNACES—Automatic
Electric Furnace Co., Salem, O.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.

FURNACES—Electric
Electric Furnace Co., Salem, O.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
John Robertson Co., Brooklyn, N. Y.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.

FURNACES—Wire
Electric Furnace Co., Salem, O.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Grasseli Chemical Co., Cleveland, O.
Wm. M. Parkin & Co., Pittsburgh, Pa.

INSULATION—Cable or Cable Filler
National Patent Reed Sales Co., Phila., Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
Drakefield, B. F., & Co., New York, N. Y.
R. H. Miller Co., Homer, N. Y.
Robertson, J. T., Inc., Syracuse, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
New England Butt. Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Machinery Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Coilers
Broden Const. Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

1934

Annual Meeting

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For Detailed Information Write

RICHARD E. BROWN, Secretary

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BUYERS' GUIDE, Continued

MACHINERY—Copper Wire Drawing and Rolling
H. J. Ruesch Machine Co., Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cutting
Broden Construction Co., Cleveland, O.
Lew's Machine Co., Cleveland, O.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Measuring Wire & Cable
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
United Eng. & Foundry Co., Pittsburgh, Pa.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Rubber Strip Covering
Farrel-Birmingham Co., Ansonia, Conn.
New England Butt Co., Providence, R. I.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
John Royle & Sons, Paterson, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila. Pa.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Lew's Machine Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Lew's Machine Co., Cleveland, O.
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Grasselli Chemical Co., Cleveland, O.
Wm. M. Parkin & Co., Pittsburgh, Pa.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.

PAPER—Insulating
National Patent Reed Co., Philadelphia, Pa.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REELS AND SPOOLS—All Kinds
Avoca Mfg. Co., Avoca, N. Y.
R. B. Hayward Co., Chicago, Ill.
Lew's Machine Co., Cleveland, O.

REEL AND TENSION STAND—
Sleeper & Hartley, Inc., Worcester, Mass.

REEL CRUTCHES
R. B. Hayward Co., Chicago, Ill.
Watson Machine Co., Paterson, N. J.

ROLLING MILLS—See Machinery—Rolling Mill

ROLLS—
Lewis F'dry & Machine Co., Pittsburgh, Pa.
United Eng. & Fdry. Co., Pittsburgh, Pa.

RUST PROOF COMPOUND
American Lanolin Co., Lawrence, Mass.

SOAPS—Wire Drawing
Drakenfeld & Co., B. F., New York, N. Y.
R. H. Miller Co., Homer, N. Y.
Robertson Co., J. T., Inc., Syracuse, N. Y.

STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

VULCANIZERS
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.

WIRE—Enameled For Coils
Winsted Insulated Wire Co., Winsted, Conn.

WIRE—Manufacturers
Keystone Steel & Wire Co., Peoria, Ill.

WIRE—Nickel Silver and Phosphor Bronze
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification
Seymour Mfg. Co., Seymour, Conn.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Keystone Steel & Wire Co., Peoria, Ill.

WIRE AND STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

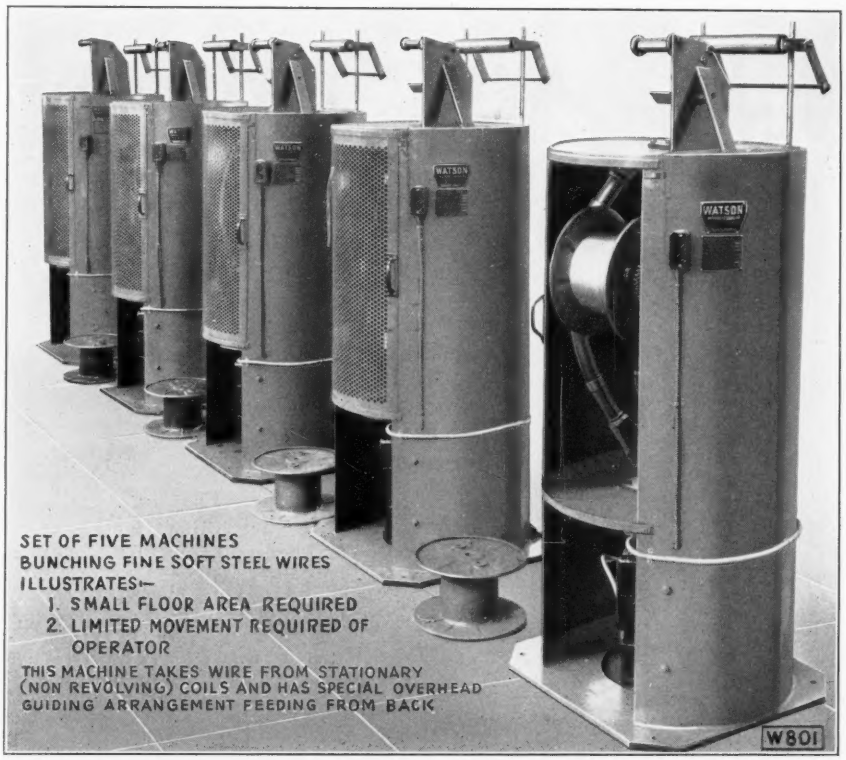
This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

The Watson Machine Company

ESTABLISHED 1845

Paterson, New Jersey, U. S. A.

Engineers . Founders - Machinists

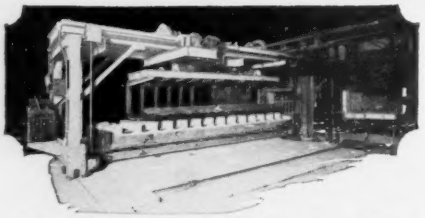

WATSON
WATSON
WATSON
SET OF FIVE MACHINES
BUNCHING FINE SOFT STEEL WIRES
ILLUSTRATES—
1. SMALL FLOOR AREA REQUIRED
2. LIMITED MOVEMENT REQUIRED OF OPERATOR
THIS MACHINE TAKES WIRE FROM STATIONARY (NON REVOLVING) COILS AND HAS SPECIAL OVERHEAD GUIDING ARRANGEMENT FEEDING FROM BACK
W801

A modern high capacity installation of five WATSON BUNCHERS V7 for fine wire bunching, for single operator is shown above.

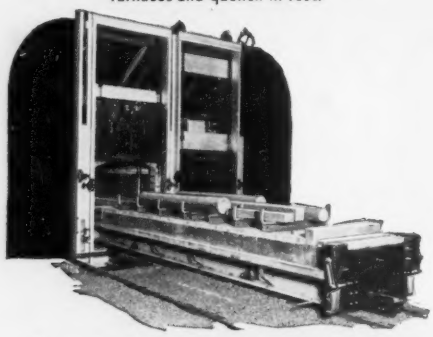
At 1″ lay 42,000 feet of strand is produced hourly.

Small floor area, and automatic electric stops enable single operator to take care of eight machines with ease.

Send for latest bulletin and prices.

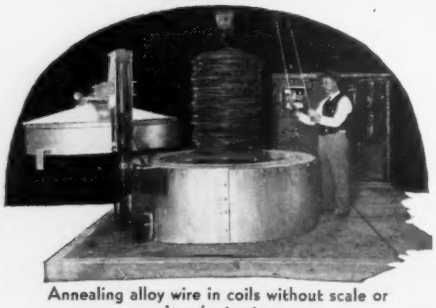


Fully motor operated crane handling alloy steel for furnaces and quench in rest.

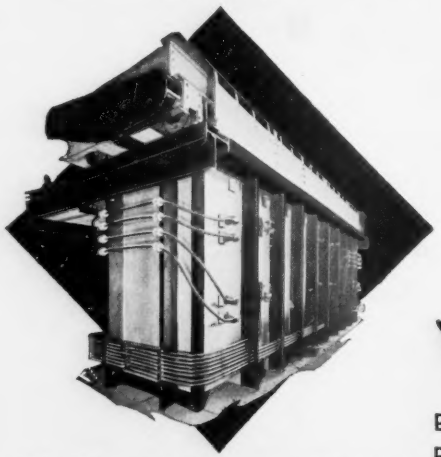


Two more car type furnaces for normalizing and annealing alloy steel.

Rectangular pit type furnace annealing alloy steel in tubes.



Annealing alloy wire in coils without scale or decarburizatic n.



Spheroidize annealing alloy rods up to 27 ft. long.

FURNACES FOR THE TREATMENT of ALLOY STEELS

IN ANY SIZE, SHAPE OR QUANTITY

To positively duplicate established time-temperature cycles---and to provide the high degree of accuracy necessary in treating alloy steel are but two functions of the numerous installations we have made in prominent alloy steel plants throughout the country---a few are shown at left.

The ability to design and build successful heating and material handling equipment, so arranged as to produce the desired results with the minimum of labor and expense, is the result of wide experience and the careful attention given, to each customer's particular needs.

Printed matter showing these and other types of furnaces for treating alloy steel and various other products gladly sent on request.

Put your heat treating problems up to our EXPERIENCED engineers. We will design and build equipment to fit your particular requirements.

THE ELECTRIC FURNACE CO.
SALEM, OHIO.

Electric and
Fuel Fired Furnaces.

No Job Too Large
or Too Unusual.